

Moon Travellers



• PETER LEIGHTON •

MOON TRAVELLERS

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A Dream that is becoming a Reality

PETER LEIGHTON



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To NICOLA

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*Soon, as the evening shades prevail,
The Moon takes up the wondrous tale.*
Addison.

PREFACE

THE world, educated by now as to the prowess of Russian and American scientists and technicians, is ready to accept as only a question of time that men will be following the monkeys, dogs and rabbits into space and that their first destination will be the Moon.

Indeed, the Russians have publicly announced their programme to achieve this goal. The conquest of the Moon will take place in four stages. The first will be the reconnaissance of outer space by robots; the second, a landing of robots on the surface of the Moon; the third, the exploration of the Moon by robots; the fourth, the placing of men on the Moon, with good prospects of bringing them back to earth alive.

Professor Anatoly Blagonravov, the Director of the Soviet Space Programme, has recently discussed the establishment of permanent lunar bases which might be used by relays of scientists and technicians, commuting to and from the Moon. He disclosed that designs for such stations are being prepared, with power houses using the rays of the sun as an energy source.

American scientists are confident that they can match the Russian efforts. President Eisenhower emphasized in January 1960, that the United States is pressing forward in the development of large rocket engines to place much heavier vehicles into space.

Biologists are taking over from science-fiction writers in the debate about the kinds of life space travellers will meet on the planets. An American, Dr. C. H. Schmitt, expects to find beings "with legs, teeth and eyes perhaps similar to ours, but mounted on a body of an animal with the trappings of a vegetable . . ." Professor P. Zonn, of the Polish Academy of Science, says he would not be surprised if our space travellers find "a higher form

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of life on the planets", while Professor H. S. G. Massey of University College, London, the chairman of the British Committee on Space Research, ponders on the possible characteristics of "the little green men" we might eventually encounter.

Although few anticipate discovering anything more lively than some significant chemical and physical phenomena on the Moon itself, all the authorities agree that the Moon will prove a most useful foothold and stepping stone in the search for our contemporaries in space.

Yet, for two thousand years the Moon has been peopled and explored by man's imagination and the belief that we may yet find lunar inhabitants dies hard.

This book is an attempt to recall the existence of those long-established Selenites and the adventures of their visitors from the earth, before their memory is eclipsed by the arrival of rocket-borne, scientific investigators. It is also a small tribute to those Moon dwellers, many of whom were so very human.

It would have been impossible to assemble those stories of imaginary Moon travels without the assistance of a large number of people, many of them as equally fascinated by the subject as the author. I can express my thanks to only a few by name, here. In particular, I wish to thank the Librarians and staff of the British Museum, the London Library, the University College, London, the libraries of Westminster, Battersea, Wandsworth, Wimbledon, and Middlesbrough. I owe a special debt to Miss E. M. Jowett, M.A., the Chief Librarian of Merton and Morden; to Mr. Richard Aldington, who generously gave me permission to use extracts from his wonderful translation of Cyrano de Bergerac's space travels; to Miss Rosica Colin; to the executors of H. G. Wells; to Messrs. Sampson, Low, Marston & Co.; Messrs. Collins; Messrs. Routledge & Kegan Paul, Messrs. A. & C. Black, and other publishers for permission to quote from books published by them. Miss Dorothy van Rose gave me valuable advice, Mr. E. Morland Lee afforded me unstinted and conscientious help, and without Mr. Edward H. Spiro this book could never have been written.

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CHAPTER ONE

The Moon is Ours

MAN is boldly reaching for the pale virgin, a quarter of a million miles away, and will surely take her.

Within two years, from the day when the first Russian "Sputnik" was launched in 1957, until September 13, 1959, when the first man-made projectile circled the Moon and conveyed to us, for the first time, the pictures of the Moon's "other side", man's dream of setting foot on the lunar world has almost been achieved.

Now, it is only a question of time before the first man will land in the barren, silent world of the Moon. Clad in a pressure suit lined with asbestos—to ward off cosmic rays and scorching heat—and carrying his breathing apparatus and rubber cylinders containing food paste and drinking liquids, almost blinded by the sunlight reflected from the earth, a blaze sixty times stronger than brightest moonlight, he will attempt to walk upon the Moon's surface, with its covering of thick, black dust.

For centuries, as this book will show, scientists, dreamers, eccentrics, philosophers and satirists have considered the possibilities and merits of such an undertaking. Most have come to the conclusion that it would be well worth while.

To the scientists the conquest of the Moon may bring the answer to the eternal question how life on earth was created. Biologists believe that the mystery of life began when molecules of complicated structure were formed, and from these molecules spores and bacteria developed which evolved over millions of

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years to become plant life and animal kingdom. How these molecules were built up and procreated is not known. Do these "pre-life" processes occur on the Moon? Will man discover these primary molecules in the Moon's virgin dust?

This possibility alone would justify the enormous efforts now being made to land on the earth's satellite. There are, of course, many other reasons why scientists advocate such a venture, which to many of us might seem foolish and extravagant. Problems of the nature and intensity of cosmic rays, which greatly influence life on earth, could be investigated for the first time. Astronomers would gain an entirely new concept of the universe, geologists would possibly find unknown minerals, chemists may discover new elements, biologists have already, during the preparations to equip the would-be moon travellers for their journey, probed into new problems of human behaviour and survival. The catalogue of reasons why man should go to the Moon is, indeed, interminable.

And there are also some very mundane reasons. American and Soviet scientists earnestly believe that a colonization of the seemingly uninhabitable Moon is a possible proposition, and some believe that man could exploit its mineral resources. It is, for instance, likely that uranium would be found in large quantities.

The fact that the Moon has no atmosphere, and therefore neither air nor water, does not discourage the vision of a busy and prosperous human colony on its surface. A Soviet scientist, Professor Nicolai Alexandrovitch Vavarov gave, in the summer of 1959, the following description of a Moon city:

'Beneath a gigantic cupola of some new plastic material would rise houses, factories and production centres. The roof of the dome would act as a filter for the fierce sunrays and thus moderate the heat and light, which would be otherwise insufferable. Hydrogen and oxygen would be produced from the Moon's minerals, by processes which are well known to us. Even water

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could be brought up from the depths and used to irrigate areas protected by the great roof. Because of the artificial conditions which could be provided and the weak power of attraction on the Moon, the colonizers could grow their food, and a radish would shoot up in a day or two to the height of a palm tree. . . .

Landing on the Moon and the exploration of its surface offer tremendous and startling possibilities. And quite apart from the breathtaking vista which scientists have opened to us, the politicians and generals have a vision too, though one which is rather unpleasant and disturbing. The Sputniks and Luniks, speeding through space, were launched by huge rockets which have been developed from intercontinental ballistic missiles. At present, the Russians have impressed the world with their technological prowess, devoted to peaceful exploitation of space and probing of the Moon. But—say American generals—no one could stop the Russians sending into orbit a score of rockets, carrying H-bombs instead of instruments, radio transmitters and photographic cameras. And these missiles could be made to spew their lethal fallout over any part of the United States or Europe at the pushing of a button in Moscow. There is little doubt that Soviet generals hold exactly the same opinion about the possible intentions of their colleagues at Washington's Pentagon.

Perhaps, this is the main reason for the present desperately earnest race for the conquest of the Moon between the two super-powers of the world—the United States of America and the Union of Socialist Soviet Republics.

It did not need Mr. Krushchev's presentation to President Eisenhower of a replica of a Soviet pennant with a hammer and sickle, which was carried to the Moon, to shake the confidence of Americans in their space programme. While the Soviet Linuk 2 sped to the Moon, Americans were told of three of their own rockets misfiring within twenty-four hours. When these lines are written, America has somewhat caught up with Russia. America

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has put Discoverer IV and V into orbit, succeeded in retrieving some of the instruments and, probably before this book leaves the printer's press, one of the Discoverer rockets will solve the problem of re-entry into the earth's atmosphere and thus make the project of sending a manned projectile towards the Moon, and its return to earth, seem possible.

In the meantime the procession of rockets towards the Moon has become a commonplace. The first living delegates from the earth have gone into space—dogs, mice, a rabbit, and the famous American monkeys, Abel and Baker. The latter returned safely to attend a press conference, which for the connoisseurs of the bizarre, was not inferior to the reception of Mr. George Adamski, a former Californian hamburger salesman, who claims he had circumnavigated the Moon in a flying saucer and had met inhabitants of Venus, including a charming blonde and a ravishing brunette. While Mr. Adamski could describe his visit to the Moon in great detail to Queen Juliana of the Netherlands—and was listened to attentively and trustingly—the monkeys were unable to comment on their experiences, but the world was assured that the instruments attached to their bodies, while they travelled moonwards, showed no reason why men should not follow them.

To make sure that humans will not be far behind the apes, the Americans and the Russians are spending thousands of millions on further Moon projects. The American Mercury Project aims to put a man encased in a capsule into orbit round the earth, and then round the Moon, as a dress-rehearsal for sending a manned rocket to the planet. Before that a "soft" landing on the Moon of a rocket carrying instruments, which would remain intact and send messages back to earth, may be accomplished during 1960.

The Russians have disclosed little about their plans, but Professor Alexander Mikhailov, director of the Pulkovo Observatory, revealed that Soviet scientists have plans ready to land a "robot-controlled tank" on the Moon, which would set up an automatic station equipped with instruments and television cameras,

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operated from the U.S.S.R. "Such a station on the Moon, in close contact with the station on earth, will be in preparation for the construction of a scientific base on the planet, to be serviced by human beings to be sent there . . ." he added. Other Soviet scientists, such as Professor Yurij Chlebzevitch and Professor Alexander Topchyev, deputy chairman of the Academy of Science, declared that the first men will land and stay on the Moon within seven years—that is by 1967—because by then it will be possible to bring them back to earth. And Professor Chlebzevitch contended that "at the turn of this century journeys to and from the Moon will become a routine business, the Moon will be just the seventh continent of our world and men will be mainly concerned with exploiting its mineral wealth".

Some American experts are a little more cautious and forecast that the first landing on the Moon by explorers, whose return home could be guaranteed, will take place between 1969 and 1975, though Dr. Herbert York, head of the space research unit of the U.S. Defence Department, agreed with the Russians that the first human Moon travellers would reach their destination within seven to ten years from now.

The Moon travellers-to-be are being trained, both in America and Russia. The Russians prefer to conduct these preparations quietly, but the Americans, as one would expect, have given full publicity to their plans. "From a nation of 175 million stepped forward seven men, cut of the same stone as Columbus, Magellan, Daniel Boone, Orville and Wilbur Wright . . ." reported an American newspaper with more enthusiasm than exactitude. Apart from their undoubted courage and skill, it would be difficult to find a group of men more unlike the famous explorers and airmen listed with justifiable pride by that newspaper.

The seven, all officers of the armed forces, were selected with utmost care by a board of scientists. The essential requirements were a university degree in physical science or engineering, completion of military training as test pilots, a minimum of 1500

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hours logged, as a flier, age under forty but over twenty-five, medium height and weight, to match the small capsule in the missile and, most important of all, a stable and not too imaginative-personality. The thirty-two finalists—from among whom the seven were selected—were subjected to treatment worthy of the weakest component in any manned missile—man himself. With the aid of electronic equipment the behaviour of their bodies was observed in minute detail and in circumstances similar to those they would experience on their journey to the Moon. They were jolted, vibrated with sound waves, crushed, chilled, roasted, isolated in complete darkness and silence.

The chosen men emerged sane and fit. All are married, all were born in small towns. Six are Protestants, one a Christian Scientist. Three are Naval officers, three Air Force officers, one a Lieutenant-Colonel in the U.S. Marines. Five have seen action as bomber pilots in the Second World War or during the Korean war. One has won a prize of 25,000 dollars in a television quiz “Spot the Tune”. And one of them will be finally projected into space, though all of them will probably be too old to make the ultimate journey to the Moon when the time comes. However, no one doubts that when the time comes other volunteers will “step forward from a nation of 175 million”, will undergo similar or even more complex tests and training, and that one of them or even several, will at long last set foot on the Moon.

What will they find when they get there? Alas, we must dismiss the dreams and fascinating descriptions of an inhabited and luscious world in the Moon, which were the visions of imaginary Moon travellers for two thousand years. In the following chapters we shall meet the departed spirits and souls and demons, the centaurs and giants, the lunar men made of wood or tin, the strange and weird creatures whom writers from Lucian of ancient Greece to Jules Verne and H. G. Wells have created. We shall travel through green valleys, climb high mountains, admire hills made of gold and silver, amethyst and rubies, rest in the shadow

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of giant trees, taste strange and sweet fruit, sustain ourselves by pleasant odours and listen to the songs of wonderful birds.

But, when the first explorers, the servants of the governments of the United States and the Soviet Union, really land on the Moon, they will find a barren, forbidding world and they will face the greatest hazards of survival, however ingenious and perfect their scientifically devised equipment.

The Moon as a candidate for possible habitation received the death blow a long time ago. Its huge forests and pleasant meadows, strange beasts and winged creatures dreamed of by the ancients and thought probable even by sixteenth-century scientists, have evaporated under the gaze of the telescope.

Yet, even at this stage, selenology, the study of the Moon, presents many uncertainties. Though its surface has been charted in greater detail than some areas in South America and Australia, some fundamental questions remain unanswered. What is the Moon made of? Where did it come from? And there are many others. Though most scientists now agree that the Moon has no atmosphere, there are some who insist that it has, though of an entirely different composition than the earth's atmosphere. Has the Moon a magnetic field? How were its craters made? On all these problems modern scientists are still divided, or unable to explain them without ambiguity or conjecture.

We know that the Moon is arid, airless, without animal or vegetable life, alternatively hot or cold enough to kill man. We have been studying the face of the Moon turned towards the earth for centuries and ever more closely, as telescopes have been improved. And now we have fairly detailed photographs of the other side of the planet, which the Russian Lunik had conveyed to us.

We know of the high mountains and we have counted 33,000 craters on the Moon. We know that what were once believed to be "seas" are vast, waterless areas. We possess a time-honoured and long catalogue of names of these mountains, craters and

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"oceans", a romantic gazetteer of the Moon which we owe mainly to the Jesuit priest Riccioli. We still use names such as Sea of Serenity, Sea of Vapours, Ocean of Storms, Sea of Nectar, Sea of Rains, Lake of the Dead, Bay of Dew, Sea of Moisture, Sea of Tranquillity, although we know that the planet is completely dry. Later astronomers added to Riccioli's nomenclature many monuments immortalizing themselves or their celebrated colleagues, so that with names like Crater of Copernicus, Crater of Kepler, Mount of Newton, Leibnitz Mountains, Crater of Ptolemy, Mount of Tycho, Crater of Herschel, the Moon provides a vast cemetery of famous selenologists.

But, although the face of the Moon has been mapped so precisely and named with romantic affection, its features still cause violent controversy among the experts. Modern astronomers reject the theory that its thirty thousand craters were caused by volcanic eruptions. When the Russian astronomer Nicolai Kozyrev announced, in 1958, that he had detected an eruption of a volcanic nature, which could be evidence that parts of the Moon's core are still hot, his statement was rebuked by other authorities, including some of his Soviet colleagues. Wrangling over the origin of the creators is of such long standing that it has been dubbed "the astronomers' hundred years war".

Many of the Moon's craters are in rows, others scattered about. Some are huge—up to 100 miles in diameter—some quite small. A hump is seen in the centre of many. The walls of the big craters rise as high as two thousand feet in relation to the surrounding plane, while the depression in the centre may plunge as deep as five thousand feet. It is not known whether the craters are of volcanic origin at all. More likely they are the scars made by enormous meteors striking the Moon's surface. Another theory is that the Moon, gradually altering its course at some point in its existence, collided with many lesser satellites which smashed into her to produce the craters. If this theory is correct the biggest scar of all, the Mare Imbrium (Sea of Rains), which is

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about a hundred miles across, is the product of a gigantic collision with the largest satellite of all.

Another view is that lava was formed through the energy released by the meteorites hitting the Moon and melting themselves and the surrounding rock. If this is so, the Moon's surface may be covered with gravel rather than dust. Yet another theory put forward is that, while the Moon may have been defaced long ago by meteorites, the smooth areas consist of neither lava nor gravel but of dust created by erosion. The erosion which could have created this dust, a mile deep in places, was quite unlike the erosion by water—in the form of rivers, seas, and ice—which has fashioned the earth's surface. The Moon, it is believed, had never had enough water, if any, in its composition to affect the landscape in such decisive manner. The erosion could, therefore, have been caused only by radiation from the sun, by cosmic rays and by meteorites. Hopes and fears that the deep dust might give the first rockets from the earth either a comfortable, or an altogether too soft landing, have been largely dispelled by recent experiments which showed that the dust is quite firm, like caked mud, because of the absence of atmosphere.

In view of the doubts which still exist about the way the face of the Moon was made, it is not surprising that science remains perplexed about the Moon's origin. The appealing idea that she is an offspring of the earth, a Siamese twin of our own world, separated only when both bodies changed from their molten into a solid state, is out of fashion. The advocates of this theory insisted that the monstrous wound left on earth when the Moon tore away and floated into her own orbit, was filled with water and is now the Pacific Ocean. The more impressive hypothesis is that the Moon was formed out of cosmic dust and gases and was then captured by the earth's gravity and made into a satellite. This would presuppose that the earth is much older than the Moon, but Dr. Gerard Kuiper, head of Chicago's Observatory recently put up a theory that the Moon was formed at the same

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time as the earth—about five and a half billion years ago—but at first revolved only 20,000 miles away, compared with the present egg-shaped orbit which varies between 221,465 miles and 252,710 miles from the earth. One cannot help but ponder nostalgically about the opportunities we missed. A few billion years ago a supersonic jet aircraft could have reached the Moon within hours.

Even an apparently simple question such as the path taken by the Moon is still unanswered. The Moon, like the earth, is subject to the attraction of the sun but to this day mathematicians have not fully resolved the complex gyrations of the three bodies whose relevant positions are, like the stripes of the zebra, never exactly repeated.

It is these gyrations which partly account for the difficulty of hitting the Moon with a rocket. Hanging in the sky, the Moon appears to the layman to be as easy a target as any marksman might desire.

However, the Moon is a moving and not a sitting target and the rocket shot at the Moon leaves a rotating earth. Indeed, the Moon is rushing around us at a speed of 2,270 miles per hour, much quicker than even the supersonic airliners of the future. Moreover, as we have seen, the Moon fluctuates about the mean position of its orbit, which is not circular. Extremely complicated calculations are necessary to find out the ballistic curve a rocket has to take to teach the Moon and not miss it by several thousand miles.

The practical requirements of travel to the Moon are by now known to the scientists, at least in principle. For the outward journey the launching speed must be at least 25,000 miles per hour in order to overcome the earth's gravitational pull. Small retracting rockets will be attached to the space vehicle to slow it down on the later stage of the journey and to make a reasonably gentle landing. Probably some form of retardation will also be required if the missile is to be captured by the gravitation of the Moon.

In one respect, at least, the return journey should be easier as

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the Moon's gravitational pull is much weaker than that of the earth, and a launching speed of only 5,500 miles per hour would be enough to escape it.

Obviously, the known and unknown hazards of a Moon journey are tremendous; worth facing only if one believes that the conquest of the Moon is the first step into a universe which will prove as important in the history of life as the initial struggle of primeval life in the sea to clamber on to dry land.

The would-be Moon travellers are being trained and equipped for all known eventualities and dangers. There may be others of which even the most knowledgeable experts are still ignorant. The space travellers will be encased in an airtight, armoured suit of several layers. The smallest tear or leak in their protective clothing would soon prove fatal. After their landing they will be unable to discard their diver's helmets and they will have to carry oxygen with them at every step. They will find the changes in temperature sudden, violent and extreme. During the day they will have to shelter as in the sunlight the temperature might well exceed boiling-point. After the sun sets the drop in temperature within a few hours could well be more than 300 degrees Fahrenheit. Furthermore, it is still problematic whether their armour will provide complete protection from the constant radiation and the bombardment by micro-meteorites, which are thought to scour the lunar scene.

But whatever the physical discomfort, it will be more bearable than certain psychological sensations which the Moon travellers will experience during the journey and after landing. The phenomenon of weightlessness, for instance, still provides some of the most difficult problems. It is inherent in any condition where the earth's gravitational pull is balanced by centrifugal force. The two monkeys, Abel and Baker, apparently suffered no ill effects from this phenomenon and, physically, man too can probably adjust himself to it. But what will be the psychological effects of weightlessness. For instance, drinking and eating will

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be a difficult feat, only to be accomplished by muscular force and great concentration of brain power. Gravity helps a drink down. Under weightless conditions it will be an effort to swallow. A British expert, Wing-Commander I. R. Bowring, one of the R.A.F. officers who under an exchange agreement worked with American space project experts, devised an interesting scheme to enable the Moon travellers to sustain themselves. Food in concentrated form will have the consistency of paste and will be squeezed from rubber tubes either on to a plastic plate or direct into the mouth. Even the problems of excretion and urinating have been carefully inquired into, because the spacemen will need special effort to accomplish these normal functions. These are but a few examples, taken at random, of the fantastic difficulties which the Moon travellers will face.

American authorities have stated that the chances of a Moon traveller returning alive are, at present, estimated at 97 per cent. These are better odds than those governing the chance of surviving from the hazards of road traffic in our cities. The American volunteers appear not to be unduly worried that they might never come back. Indeed, one of them declared that the Moon venture was, in his opinion, much less dangerous than climbing Everest. And Everest was said to have been climbed by its conquerors just "because it was there". The motives for going to the Moon are certainly more potent and more exciting.

Later in these pages we shall be told by many imaginary Moon travellers why the Moon had exercised such an overwhelming if irrational attraction upon them. But they travelled into the universe only in their imagination and in the comfort of their homes. What are the motives of the "real" Moon travellers, who are ready to obey the order "go" and to accept the risk not only of never seeing their families and friends again, but of perishing under most terrible circumstances? The seven "supermen" were questioned searchingly on this subject and their replies are worth recording.



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Captain Virgil Grisson, a married man with two children, said: "Sometimes I lie in bed at night and think: now, what in hell do I want to get up on that thing for? Why do I want to risk my life? The answer is that I am a career officer. If my country has decided that I am one of the better qualified people for the mission, then I am glad I can participate." Captain Donald Slayton, also married and father of two children, is fascinated by the fact that he will be one of the first men to attempt something never attempted before: "I feel I am in on the ground floor of something that human beings will be concentrating on for the next thousand years . . . and this first ride will be something to remember." Captain Gordon Cooper, married, with two children, agreed: "I, too, want to be one of the first ones. I was born and raised in the flying crowd. My father is a retired Air Force colonel. I was handling the pilot's stick from the time I was seven or eight, and I had my first solo flight when I was sixteen. There will be a lot of firsts: the first man on a ballistic firing, the first man in orbit, the first man into orbit round the Moon, the first man to land on the Moon . . . I want to be one of them."

Captain Scott Carpenter, who is married and the father of four young children, admitted that most of his friends believed he was "a nut". His reasons for volunteering were neither the call of duty nor patriotic motives. "My main reason for volunteering is, quite frankly, that it is a chance for immortality. Most men never have an opportunity for this. I was offered a chance to pioneer on the grandest scale. This is something I would willingly give my life for . . ."

Strangely enough none of the seven would-be Moon travellers gave as the reason for his decision the desire to see the Moon as a visitor, or to contribute to scientific research. Neither personal curiosity, nor the thought of serving mankind's progress seem to be their motives.

This is a sobering discovery. It seems that these stolid servants of the State, be it the United States of America or the Soviet

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Union, are not concerned with the eternal dream of man to reach the stars. They will go to the Moon, and if the remaining 3 per cent against their chance of returning does not intervene, come back to earth with a factual report of their journey. In doing so they will fulfil the dream and destroy it for ever.

Let us, therefore, preserve that idle dream, if only for a brief while. Let us look at some of the enchanting stories, which were written in past centuries by the Moon travellers of the imagination—the first stumbling, visionary and fictitious chapters in the epic of Man's emergence from the earth towards space.

CHAPTER TWO

The Dream of the Moon

MANKIND'S fascination with the Moon was first expressed in superstitious and religious forms. The Moon and the stars could be observed with the naked eye. The sun, in its dazzling splendour, defied even this simple examination; it was an object of wonder and worship, not a subject for dreams.

In the evening, when the Moon shone on the firmament, mysterious and mild, people were at ease. By its light they told stories, made love, pondered about the nature of things, spun their golden dreams.

The technicians today preparing their raging rockets on the launching pads of Cape Canaveral and Siberia, in the Sahara and at Woomera, have not yet shattered completely the Moon's mystique.

There are still many echoes of the relations of our ancestors to "the Queen of the silver bow". We turn our coins at new moon. Easter is fixed by the full moon following the spring equinox. In Lancashire they still bake moon cakes for the "queen of heaven", in Suffolk it is considered unlucky to kill a pig when the Moon is on the wane. We still use many proverbs and sayings alluding to the Moon and its mysterious powers; we say "moon-struck" and "loony". Legends about the Man in the Moon abound, and in many civilized parts of the world, including France, Spain and Scandinavia, lunar festivals and customs prevail.

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And there is, of course, the flourishing industry of astrology, horoscopes and fortune-telling, based partly on the behaviour of the Moon.

Neither has the belief died out that the Moon exercises influence upon sexual life.

As late as the end of the last century Yorkshire clergy were denouncing "shameless women who worship the Moon on their bare knees, praying that they should be blessed with children". In Cornwall girls go into the fields at new moon to ask that they should see in their dreams their future husbands. In some parts of Scotland women still curtsey at the full moon. And many a countryman feels uneasy during an eclipse, which he believes could make his cattle sterile.

The inward rush of Western civilization has yet to swamp remnants of sexual cults in Africa and South America. In the Congo eunuchs carry out sacrifices beneath the Moon to ensure the virility of the tribe's women. In some remote parts of Western Africa the initiations of young men into the mysteries of sex take place at new moon, and are accompanied by orgiastic ceremonics. Some of the revolting Mau Mau orgies in Kenya were reserved for the night of the new moon. Even in modern Buddhism the goddess Sachi—the Moon—symbolizes female fertility and many peoples and religions regard the Moon as "the great giver of life".

The fact remains that a woman's reproductive cycle coincides with the lunar periods. And there are some startling and unexplained lunar rhythms ordering the behaviour of many animals.

From the superstitious awe of the Moon it was only a short step to the belief that she was populated with gods and spirits. To the ancient Moon gazers the Moon stimulated speculation about the universe and the possibility of life in other worlds. The strange spots on the Moon's face appeared as shadowy pictures of things and beings—of mountains and valleys, rivers and oceans.

To the Homeric Greeks the Moon was a real world, inhabited

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by titans and gods, who could take human shape at will, and also by human spirits, departed or banished from the earth.

In the early Greek mythology the Moon represented the goddess Selene whom the Greeks had adopted from the Egyptians. Later, Selene became Diana, daughter of Jupiter and Latona, a twin sister of Apollo, god of the sun. The Greek philosophers believed that the Moon was inhabited, though they took a more sceptical view of the existence of gods and goddesses. But even Socrates, when accused of innovating upon the Greek religion and blaspheming against the Athenian deities, recanted at his trial: "Are you accusing me of not believing that Apollo and Diana are gods, as the rest of mankind thinks?"

Lunar and solar worship prevailed long after Homer's Olympus had been established. But, six centuries before Christ the great thinkers in ancient Greece were not mere star gazers. They studied the heavens in order to penetrate the mysteries of the universe. Pythagoras, the great mathematician, founded in Croton his famous school and community which embraced both mystical and rational doctrines. The Pythagoreans laid the foundation of some of the exact sciences—geometry and arithmetic—and they also produced a new, speculative concept of the universe.

This concept stimulated the interest in the Moon, the "planet" nearest to the earth. Plato told in his "Myths" of the rise and fall of human souls through the heavenly spheres. Xenophanes was convinced that the Moon was inhabited and speculated upon the possibilities of "reaching that other world and meeting its inhabitants".

But it took five centuries before Plutarch, the Greek thinker who lived between A.D. 46 and 120, gave us the first account of a supernatural visit to the Moon. He was not an astronomer, though he was greatly interested in mathematics and in physical phenomena, while steeped in Platonic philosophy and mysticism.

In his *Facies in Orbe Lunare* (Of the Face which appears on the

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Orb of the Moon) he dealt with the size and shape of the planet, its distance from the earth, and the problems that would confront man to reach it. He was almost certain that the Moon was inhabited and, for corroboration, he called upon the Pythagoreans: "They affirm that the Moon is terrestrial and inhabited like the earth, peopled with the greatest living creatures and the fairest plants . . ."

Plutarch's treatise took the form of a dialogue between eight friends. They discussed what they saw in the night sky, the enigma of the Moon's movements and its eclipse, and they arrived at opinions about its distance from the earth, its density and attraction. Their conclusions were more accurate than many notions current in later centuries.

The group included an astronomer, a mathematician, a literary man, and a philosopher, with Lamprias, Plutarch's elder brother, as the genial and sensible chairman. Much of the argument consisted of an attack on Aristotle's views—later so perversely interpreted by the Stoics—that the Moon was a fiery, star-like and immovable body.

The friends discussed the shape and nature of the Moon and inquired whether the markings on its face were reflections of earthly oceans, or signs of life.

The dialogue was not, however, a scientific conference, and Plutarch would have been the first to disclaim any intention of writing for scientific men. When he discussed scientific details of astronomy and mathematics, he put into the mouths of the speakers quotations from Aristarchus* such as that "the distance of the sun is to the distance of the Moon from us in a ratio greater than eighteen to one, less than twenty to one, and that the distance of the Moon from the earth is fifty-six times the earth's radius. . . ."

Again Plutarch also quotes the brilliant and daring claim of

* Greek astronomer, about 250 B.C., taught that the sun and the planets were immovable bodies and the earth revolved round the sun.

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Aristarchus that "the earth has a daily motion on her axis and an annual motion round the sun", a claim made eighteen centuries before Copernicus and Galileo.

One of the friends, Sextius Sylla, a Carthaginian, was asked to tell his "Myth of the Moon", a story which he had heard from a friend in his native city.

Before Sylla could begin his tale, Theon, a young writer from Egypt, interrupted eagerly with the question "is the Moon inhabited? I want as much as any of you to hear what Sylla has to say, but first I should like to hear about the dwellers in the Moon, not whether there are any such, but whether there can be, for if it is impossible, then it is also absurd that the Moon should be an earth. . . ."

It was not Theon's first sally; indeed his cheerful and outspoken questions, such as "Why is there a Moon at all?" remind one of the quips of Michel Ardan, the poet, in Jules Verne's *From the Earth to the Moon*.

"It appears," insisted Theon, "that the Moon has been created for no end or use at all, if she bears no fruit, offers no abode to human beings, no livelihood, no existence. Many things are said about the Moon, some in jest, some seriously. For instance, that the Moon hangs poised over the heads of those who dwell on earth. We see the Moon in longitude over the Zodiac, in latitude, and in depth; one movement is revolution, another a spiral . . . if men dwell on her they would be lashed by the tremendous speed. It is no wonder if a lion did once fall on to Peloponnesus, owing to the velocity. The wonder is that we do not see every day men tumbling off through the air and turning somersaults . . .

"I ask you," he continued, "if the people in the Moon can endure twelve summers in each year, with the sun standing plumb straight above them at every full moon? Then as to winds and clouds and showers without which plants can neither receive nor maintain existence, it seems doubtful to conceive of their being formed, because the surrounding atmosphere of the

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Moon is too hot and too rare. Or are we really to say that, as Athene dropped a little nectar and ambrosia into Achilles' mouth when he was refusing nourishment, so the Moon—who is called Athene—feeds her dwellers by sending ambrosia day by day?" .

Lamprias, the chairman, a little impatient to hear Sylla's story, replied briefly to Theon's sarcastic remarks.

"Supposing that men do not inhabit the Moon, it does not follow that the Moon has come into being for nothing," he admonished the poet. "Our earth, as we see, is not in active use or inhabited in her whole extent. Only a small part of the earth, mere promontories or peninsulas which emerged from the abyss, is fertile in animals and plants. Of the other parts some are desert, while most are sunk under the ocean."

Lamprias tried to disprove Theon's arguments, saying that the oceans on the Moon, the vapours from the air and even from the earth could provide the moisture necessary for life on the Moon, that the extreme heat experienced during the full moon and the extreme cold during the eclipse would not last long and so, between those seasons, the Moon dwellers could enjoy long spells of spring-like and pleasant climate. As to the woods and crops, in Athens they were nourished by rains, but in other places the earth drank water which came out of herself, not from rain; and it enjoys moist winds and dew. Lamprias, though hesitating to insist that there was life on the Moon, seemed to believe that it would be possible or even probable—an opinion which Plutarch obviously held himself.

At last Sylla was able to begin his tale, although not before he had appealed to Lamprias "to shut the door of your oratory".

First Sylla told of an island, Ogygia, mentioned by Homer, which lay "distant from Britain five days' sail to the West".

"There are three other islands not far from Ogygia. To the great continent by which the ocean is fringed is a voyage of about five thousand stades, made in rowing-boats, from Ogygia, though

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less from the other islands. The sea is slow of passage and full of mud because of the many streams which the mainland discharges. The sea is heavy like land, and some are of the opinion that it is actually frozen to ice.

"The coasts of the mainland are inhabited by Greeks, who speak of themselves as continental, and of those who inhabit our land as islanders. They think that in after time those who came with Hercules and were left behind by him, mingled with the subjects of Cronus*, and rekindled, so to speak, the Hellenic life which was becoming extinguished and overburdened by barbarian language, laws, and ways of life.

"These men pay the first honours to Hercules, the second to Cronus. When the star of Cronus—called by us the Shining Star—has reached Taurus again after an interval of thirty years, they send forth men, chosen by lot, in many ships, putting on board all the supplies necessary for the great voyage before them, and for a long stay in a strange land.

"They put out, and naturally do not all fare alike; but those who come safely out of the perils of the sea, land first on the out-lying islands. These are inhabited by Greeks who had been sent before them. Those who have joined in the service of the god for thirty years are allowed to sail back home, but most prefer to settle in that place, some because they have grown used to it, some because all things are there in plénty without pain or trouble, while their life is passed in festive sacrifices or given to literature and philosophy.

"The natural beauty of the island is wonderful and so is the mildness of the surrounding air.

"Some are actually prevented by the god from sailing away, manifesting himself to them not in dreams only, for many meet with shapes and voices of spirits, openly seen and heard. Cronus himself sleeps in a deep cave, resting on rock which looks like gold. Birds fly in at the topmost part of the rock, and bring him

* The Greek equivalent of Saturn.

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ambrosia, and the whole island is pervaded with the fragrance shed from the rock as out of a well.

"The Spirits serve and care for Cronus, having been his comrades when he was really king over gods and men. Many are the utterances which they give forth, but the most important are those they announce when they return as dreams of Cronus.

"The stranger having been received here and serving the god at his leisure, attained much skill in astronomy, as it goes with the most advanced geometry. Of other philosophy, he applied himself to the physical branches. Then, having a great desire to see 'the Great Island' (for so, it appears, they call our world) when the thirty years were passed, and the relief party arrived from home, he said farewell to his friends and sailed forth, carrying a complete equipment of all kinds, and abundant stores of provision in golden caskets. All the adventures which befell him, and all the men whose lands he visited, how he saw holy writings and how he was initiated into all the mysteries, would take more than one day to enumerate. So listen now to those of his adventures which concern our present discussion.

"He spent a long time in Carthage. There he discovered certain sacred parchments, which had been secretly withdrawn when the older city was destroyed. They had lain a long time in the earth undiscovered. From them he learned that of all the gods who appear to us, we ought specially honour the Moon because she was the most potent of all.

"When I marvelled at this and asked him for an explanation, he told me: Many tales are told among the Greeks about the gods, but not all are told truly. For instance, about Demeter* and Cora† they are right about their names, but wrong in supposing that they both belong to the same region. Cora is on earth and has power over earthly things, while Demeter is in the Moon and is concerned with things of the Moon. Yet the Moon has

* Ceres, the goddess of harvest.

† Daughter of Ceres, also called Persephone, carried off by Pluto to be queen of Hades.

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been called both Cora and Persephone—Persephone because she gives light, Cora because we also use the same Greek word for the pupil of the eye, in which the image of the beholder flashes back, as the sunbeam is seen in the Moon.

“In the stories told about their wanderings and their search for each other, there is truth. They yearn for one another, when parted, and often embrace in the shadow. And what is told of Cora, that she is sometimes in heaven and in light, and again in night and darkness is true too. But it is not during six months, but at intervals of six months, that we see her received by the earth.

“For where the shadow of the earth rests in its passage, there Homer placed the limit and boundary of earth. To that limit comes no man that is bad or impure, but the good men are, after death, conveyed thither. They pass a most easy life, though not one blessed or divine until the second death.

“The common view that man is a composite creature is correct, but it is not correct that he is composed of two parts only. For they suppose that mind is part of soul, which is as great a mistake as to think that soul is a part of body. Mind is as much better a thing and more divine than soul, as soul is than body. Now, the union of soul with body makes up the emotional part, the further union with mind produces reason—the former the origin of pleasure and pain, the latter of virtue and vice.

“When these principles have been compacted, the earth contributes body to the birth of man, the Moon his soul, the sun his reason, just as he contributes light to the Moon.

“The death which we die is of two kinds. The first death makes man two of three, the second death makes him one of two, the first death takes place on earth, the second death is in the Moon. Persephone, the Moon, parts mind from soul gently and very slowly, and the best part of man is left in oneness, when separated by her.

“Each process happens according to nature thus: Each soul

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when it has left the body, must wander in the region between Earth and Moon, but all do this for an equal time. Unjust and unchaste souls pay penalties for their wrong doings. The good soul must for a certain time—sufficient to purge away the defilements which come from the body—stay in the mildest part of the air. Then they return, as from a long and distant exile, to their country; they taste such joys as men feel who are initiated, joy mingled with much amazement and trouble, yet also with hope. For many who are already grasping at the Moon, she pushes off and washes away, and some of the souls which are already there are seen to be plunged again into the abyss, because they turned round to look below.

“But those souls which have passed above and have found firm footing on the Moon, first go round like victors, wreathed with crowns of feathers, because they kept the irrational part of the soul obedient to the curb of reason. Then with the countenance like a sunbeam, in the air about the Moon, they receive tone and force from it. For what is still volatile and diffuse, is strengthened and becomes firm and transparent. They are nourished by the vapour that meets them, as Heracles said that ‘Souls feed on smell in Hades’.

“First they look at the Moon herself, her size, her beauty, her nature. And her nature is not single or unmixed, but it is a composition of earth and star. For as the earth has become soft by being mixed with air and moisture—and as the blood infused into the flesh produces sensibility—so the Moon being mingled with air through all her depth, is endowed with soul and with fertility, and at the same time receives a balance of lightness set against weight. So much then for the substance of the Moon.

“Her breadth and bulk are not what geometricians say, but many times greater.

“The reason why the Moon only rarely measures the shadow of the earth with three of her own diameters, is not her smallness

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but her heat, whereby she increases her speed, so that she may swiftly pass through and beyond the dark region. Thus the Moon bears from the dark region the souls of the good, as they hasten and cry aloud. For being in the shadow they cannot hear the harmony of heaven.

"At the same time there are borne up from below through the shadow, the souls of those who are to be punished, with wailing and loud cries. Hence comes the custom of clanking vessels of brass during eclipses of the Moon, with a din and a clatter, to reach the souls. Also, the face in the Moon terrifies them, when they are near, so grim and weird is it to their sight. Yet, really, it is nothing of the kind.

"As our earth has gulfs deep and great—for instance one here which streams inward towards us from the Pillars of Hercules, outside the Caspian Sea, or those about the Red Sea, such depths and hollows are also in the Moon.

"The largest of them is called the Gulf of Hecate, where the souls endure retribution for all things they have done since they became spirits. Two other gulfs are long, and through them pass the souls, now to the parts of the Moon which are turned towards heaven, now to those turned towards the earth. The parts of the Moon towards the heaven are called 'the Elysian plain', those towards earth 'the plain of Persephone'.

"However, the spirits do not spend all their time upon the Moon. They come to take part in the highest rites of initiation and mysteries, become guardian avengers of wrong doing, or shine as saving lights in war and on the sea. If in these functions they do anything that is not right—either from anger or to win unrighteous favour, or from jealousy—they are punished for it. They are thrust down to earth again and imprisoned in human bodies.

"Some there are whose powers are failing because they have passed to another place. This happens to some sooner, to others later, when mind has been separated from soul. The separation

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comes about by love for the sun. Through it there shines upon them that 'divine, beautiful and blessed presence for which all nature yearns. For it is through love of the Sun that the Moon herself makes her circuit, and has had meetings with him to receive from him all fertility.

"The soul remains on the Moon, retaining traces and dreams of the former life. Not at first, and not when it is quit of the body does this happen to it, but only later, when it becomes deserted and solitary, set free from mind. The self of us is not courage, nor fear, nor desire, any more than it is a parcel of flesh. It is that whereby we understand and think. The soul being shaped by the mind and itself shaping the body, stamps its form upon it so that even if it is separated from both for a long time, it still possesses the likeness and the stamp, and is rightly called the image. Of these, the Moon is the element, for they are resolved into her just as are the bodies of the dead into the earth.

"The temperate, who embraced a life of quiet and philosophy, do this speedily, for they have been set free by mind and have no further use for the passions. The ambitious, and active, and sensuous, and passionate, are distracted as though in sleep dreaming out their memories of life, but when their restless nature starts them out of the Moon and draws them to another birth, the Moon does not suffer it, but draws them back and soothes them. . . . But even those deserted by reason are received back by the Moon and are brought to order.

"Then, when the Sun again sows mind, the Moon receives it with vital power and makes new souls, and then the earth provides a body. For the Earth gives nothing after death of what she receives for birth; the Sun receives nothing save that he receives back the mind which he gives again. But the Moon both receives and gives and compounds and distributes.

"Soul like the Moon has been formed by the god, a blend and mixture of things above and things below, thus bearing the same relation to the Sun which the Earth does to the Moon.

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"Such is the story of the Moon, which I heard from the stranger," Sylla concludes, "and you, my friends, may take it in what way you will . . ."

To what extent Plutarch was inspired to write his *Face in the Moon* by Cicero's brief *Somnium Scipionis*, the dream of Scipio Africanus Minor, is not known.

Cicero was greatly interested in the possibility of the inhabitation of the Moon, and in several of his writings he agrees with Xenophanes that there is life there. Scipio's dream was not a voyage to the Moon, but a dreamer's vision of the planets: ". . . the brightness, prosperous and salutary to mankind, of Jupiter; the red and dreadful star of Mars; the Sun, leader, prince and governor of the other lights, the mind and controlling influence of the universe; and, in the lowest orbit, the Moon, kindled by the rays of the Sun . . . Below the Moon is nothing that is not mortal and perishable, except the minds given by the gods to the human race, and above the Moon all things are eternal . . ." And he exclaimed: "The Earth itself seemed so small that I was scornful of our empire which covers but a single point upon its surface."

CHAPTER THREE

First Journey to the Moon

IT was not until the second century after Christ's birth that the first story of a deliberate journey to the Moon was written. The dialogues of Plutarch and Cicero were philosophical meditations about the Universe. They presupposed life on the Moon, but it was life of a mystical, supernatural kind. Their heroes saw the Moon and its souls, spirits and demons floating through their dreams.

Orpheus, the legendary poet, son of the muse Calliope, who was said to have inherited the lyre of his natural father, Apollo, sang of the Moon in his wanderings in search of his beloved Eurydice. In one of the fragments of the "Argonautika" he told of the cities and mountains on the Moon, but we are not told how they were reached or discovered.

Plutarch died in A.D. 120, and about the same time Lucian, who became one of the great Greek satirists of the arid period in Greek literature which followed the Roman conquest, was born in Samosata, in Syria.

The Hellenistic Age, during which Greek culture with the conquests of Alexander the Great spread throughout the eastern world, had come to an end, and had been succeeded by the rise and the beginning of the decline of Rome. Lucian lived and wrote during the reign of Marcus Aurelius, which witnessed the triumph of Stoicism, the loss of the simple faith in personified deities of the old mythology, and the advent of the belief that

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the world was ruled by a universal reason. Although Christianity was only in its beginnings, the humanitarian view of the brotherhood of men exercised a strong influence in politics, the law and literature.

Lucian adopted many of the Epicurean doctrines which attacked traditional religious belief and superstitions and advocated the atomic metaphysics—the teaching of Democritos that both the physical world and the human soul consisted of infinitesimally small “atoms”—as a mechanical explanation of the universe and its creation.

This was the spiritual basis of his *True History* of cosmic voyages, of which that to the Moon was only one. Yet, contrary to Plutarch, who treated the problems of the universe in a serious manner, striving for scientific explanations, Lucian created a fanciful world in outer space. Thus he became the “grandfather” of all cosmic travel writers and, indeed, the very first science-fiction author.

It is small wonder that all his successors in this field, great thinkers like Kepler, satirists like Cyrano de Bergerac, Defoe and Swift, writers of the nineteenth century, as well as Jules Verne and H. G. Wells, freely borrowed from and even imitated Lucian.

He did not send a reporter or explorer to the Moon. In this account he made the precarious ascent himself, not in a dream but by a perilous voyage, accompanied by a bodyguard of fifty young Greek athletes, all trained in the strenuous discipline of the pentathlon in the Olympic Games.

After many terrestrial adventures their ship was suddenly caught up by a mighty whirlwind and lifted into space “some three thousand furlongs”. On the eighth day they reached “the shining globe in the sky”.

They arrived at an inconvenient moment. The inhabitants of the Moon were waging war with those of the Sun, to settle a dispute over the colonization of the Morning Star.

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Lucian's *True History* contained a great flight of fantasy, the first description of the inhabitants of the Moon.

After reporting the battle between the Moonites and the Sun people, a biting satire on the fourth Macedonian War, he quickly unfettered his imagination to provide a whimsical extravaganza of life in the Moon world.

Lucian wrote several other tales of imaginary journeys: to the Morning Star, the Zodiac, the City of Lynchopolis, the Cloud-Cuckoo Land (which obviously provided some inspiration for the author of *Alice in Wonderland*). He also sent another traveller, Icaromenippus, into outer space, having equipped him with a pair of wings, one from a vulture, another from an eagle. But the *True History* remains a classic account of a journey to the Moon. The following excerpt is from the free translation by Professor St. J. B. W. Wilson.

'I started from the Pillars of Hercules and set sail into the Western Ocean, making my voyage before a favourable wind.

'The object and purpose of my travels was curiosity. I had a desire to learn what was the limit of the ocean, and who were the men who lived on the other side. With this end in view I laid in a very large store of provisions, and put on board a sufficient quantity of water. I persuaded fifty of my friends, of the same mind, to join me. Also I provided a considerable quantity of arms, enlisted the best helmsman that money could hire, and, in expectation of a long and stormy voyage, strengthened my vessel which was of a light build.

'For a day and a night we sailed along before a favourable breeze, still in sight of land, and encountered no rough water. But on the following day, as soon as the sun rose, the wind began to freshen and the waves to grow bigger. The sky became dark, and we could not see the sail. We surrendered ourselves to the mercy of the wind, and for seventy-nine days we were tossed about in the storm.

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On the eightieth the sun suddenly shone out, and we saw at no great distance a steep wooded island, round which the water was smooth and calm. By this time the worst of the tempest was over.'

Landing on the island they discovered that it was the strange country of the tree women of which Heracles had told and which Dionysus had visited at the head of his revelling army. Though the sailors were well received, found rivers flowing with wine and many other agreeable wonders, they decided to move on in search of new adventures.

'About noon, when we were out of sight of the island, a whirlwind suddenly overtook us, and eddying round the vessel, lifted it to a height of 1,800,000 feet. The ship did not drop again into the sea but, whilst it was suspended in the air, the wind fell upon the sails and drove it along, bellying out the canvas.

'After an aerial voyage of seven days and seven nights, we sighted land in the air. It was an island, luminous, spherical and shining with strong light.

'We put in to it, and having cast anchor, landed. On examining the country, we discovered that it was inhabited and cultivated.

'In the daylight we could see nothing from where we were, but when night came, other islands became visible to us in the surrounding air, some close by, some larger and some smaller, with the appearance of fire.

'There was also another land below us, with cities, rivers, seas, woods, and mountains on it. This, we conjured, was our own world.

'Having made up our minds to proceed farther, we suddenly encountered creatures which the people of the new country call Horse-griffins. They are men riding on huge griffins, employing the birds as horses. These griffins are very large and three-headed.

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One can imagine their size, if I say that each of their wings is bigger and stouter than the sail of a large ship.

'These creatures have orders to fly round the country and bring every stranger that they may encounter to the king.

'Accordingly, they arrested us and conducted us to him. The king, when he saw us, guessed our nationality from our dress. He said: "You are Greeks, strangers?" On our assenting, he asked: "How came you here? How did you make so long a journey through the air?"

'We related to him our adventures, and he disclosed to us his own story.

'He told us that he himself also was a man, named Endymion, that once upon a time he had been carried off in his sleep from earth and brought to this land, where he was made king.

'He told us that this land was the Moon, whose light shone down upon us below. But he assured us that we had nothing to fear, bade us be of good courage and told us that we should be provided with all we needed.

"If I bring the war that I am waging now against the inhabitants of the Sun to a successful victory, you shall live in peace and happiness in my country," he added.

'We asked him who the enemy were and what was the cause of the quarrel.'

'He told us that the Sun was inhabited like the Moon and that her king, Phaeton* had for a long time past been making war on the kingdom of the Moon.

"This he began for the following reason," the Moon king told us, "I once collected some of my subjects and wished to send them to the star of Lucifer†, which was desolate and uninhabited. But Phaeton became jealous and declared that I wanted to plant the colony on his whiskers. He thwarted my enterprise by stop-

* Phaeton, son of Apollo, asked his father to be allowed to drive an aerial chariot, but was unable to guide it and nearly caused a collision between heaven and earth. Zeus struck him with a thunderbolt.

† The planet Venus, or Morning Star.

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ping the passage of my colonists by his army of Horse-ants. On this occasion we were defeated, because our force was not equal to that of the Sun King, and we had to retreat. Now I decided again to wage war and to establish the colony. Therefore, if you are so minded, join with me in the expedition. I will furnish each of you with a griffin from my stables and will provide you with all other necessary equipment. Tomorrow we will begin our march.

"Be it so," I said. Then we feasted at his table, and at dawn we arose and joined the ranks. The scouts announced that the enemy was close at hand. The main body of the Moon king's army consisted of a hundred thousand men. Of this force 80,000 were Horse-griffins and 20,000 were mounted on Cabbage-fowls. The Cabbage-fowl is a prodigious bird, bristling all over with cabbage leaves instead of wings, and his quill-feathers resembling lettuce leaves.

Then there were the Barley-shooters and the Onion-fighters. Among the foreign allies were 30,000 Flea-skirmishers and 50,000 Wind-runners. The Flea-skirmishers ride on huge fleas, the size of each is equal to that of twelve elephants. The Wind-runners are foot-soldiers and they move through the air without wings. Clad in long trailing garments, they swell them out with the wind like sails. They usually serve as light infantry.

The arrival of seventy thousand Sparrow-fighters and ten thousand Crane-riders was expected from the stars above Cappadocia.* Marvellous and incredible things were ascribed to them. But as they failed to arrive, I have not ventured to describe their nature.

Such were the forces of Endynion. The equipment of the Moon soldiers were the same. Their helmets were constructed of beans—for beans are big and strong on the Moon—and their breastplates were made by sewing together the pods of the peas. On the Moon the pod of a pea is as unbreakable as horn.

* Cappadocia, a country in Asia Minor, between the Halys, the Euphrates, and the Black Sea.

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'For the battle they deployed themselves as follows. The right flank was held by the Horse-griffins, with the Moon king and his staff, including ourselves. The left was occupied by the Cabbage-fowls, and the centre by the allied troops.

'In the Moon they have many huge spiders, each far bigger than one of the islands of the Cyclades.* The king ordered the spiders to cover with a web the whole expanse of air between the star Lucifer and the Moon. When, with all dispatch, the spiders had carried out the order and provided the battlefield, the king drew up the infantry thereupon.

'The enemy's left was held by the Horse-ants with the Sun king amongst them. These are huge winged creatures closely resembling our earth ants in all except the size. For the biggest of them was about two hundred feet long. Not only did the Sun riders fight, but also the ants themselves, with their antennae. The number of them was said to be fifty thousand. On the right wing were posted the Sky-gnats, in number also about fifty thousand, the riders armed with bows and mounted on huge gnats.

'In their rear came the Sky-crows on foot and lightly armed with bows. They were good stout warriors and slung giant radishes. He who was wounded by them could not show fight even for a brief moment, but died, because of the evil stench that immediately arose from the wound. The Sky crows were said to anoint their arrows with poison of mallows.

'Near them were stationed the stalky Toadstools, heavy armed troops who fought at close quarters, 10,000 in number.

'They were so called because they used shields made of fungus and spears of asparagus stalks. Next to these stood five thousand Acorn-dogs, mercenaries from the Dog star. They had faces like dogs and fought on winged acorns. The Sun king had sent for the missile hurlers of the Milky Way, and also for the Cloud-

* Islands in the Aegean sea, the principal were Ceos, Naxos, Andros, Paros, Melos, Seriphos, Gyarus, Tenedos.

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Centaurs. But the latter only arrived when the battle was decided and the hurlers did not appear at all. I heard afterwards that the Sun king in anger at this burnt their land.

'The two armies drew closer together, and when the signals had been given and the asses on each side had brayed—asses, I should say, they used as trumpeters—the battle began.

'The left wing of the Sunmen immediately fled, without even waiting for the charge of the Horse-griffins, and we pursued them with grim slaughter. But the Sun king's right wing gained the advantage of our left flank, and the Sky-gnats pressed on in pursuit. Then, however, the Moon's foot soldiers offered such strong resistance that the enemy turned and fled, especially when they witnessed the defeat of their comrades on the left. The rout now became undisguised. Many Sun soldiers were taken alive and many slain, and their blood flowed in streams over the clouds, so that they were dyed and became as red as they appear to us on earth at sunset. Much of the blood dropped down on the earth, so that I asked myself whether it might not have been some such occurrence as this ages ago up in the sky that made Homer suppose that Jupiter rained blood at the death of Sarpedon.*

'At our return from the pursuit of the routed Sun army we set up two trophies—one on the spiders' web, to celebrate the infantry and another on the clouds to commemorate the air fight.

'At this moment it was announced that the Cloud-Centaurs, who ought to have reached us before the battle, were riding up. They presented a very strange sight as they approached, being a combination of horses and men. The size of the men—that is to say from the midriff upwards—was almost that of the Colossus of Rhodes, whilst the size of the horses' trunks was about that of a big merchant ship. Their leader was the Archer of the Zodiac.

'Seeing the defeat of their Sun allies, they sent a message to

* Sarpedon, son of Jupiter, was king of Lycia and went to the Trojan wars to assist Priam. He was killed by Patroclus.

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the Moon king, bidding him return to the fight, whilst they fell upon the Moon soldiers, who were in disorder for they had broken rank and had scattered in the search of spoil. The centaurs routed them all and chased the Moon king himself right up to his city, killing most of his griffins. They tore down the trophies and overran the whole plain woven by the spiders. Myself and two of my companions they took prisoners.

'We were led off that same day to the Sun, with our hands tied behind with a shred of spiders' web.

'The victors decided not to besiege the city of the Moon, but, turning back, built a wall across the intervening space of air, so that the rays of the Sun should no longer reach the Moon.

'The wall was double and built of clouds. The result was a total eclipse of the Moon, and the whole planet was shrouded in perpetual night.

'In distress at these measures, the Moon king sent a mission, begging the Sun king to pull down the wall and entreating him not to leave the Moon people living in darkness. He promised to pay tribute, to be an ally, and never more to make war. As a guarantee thereof he offered hostages. Finally peace was made on the following terms:

'(1) That the people of the Sun do pull down the wall and do no longer invade the Moon, but do give back the prisoners, each for a sum to be agreed upon;

'(2) That the people of the Moon do grant freedom and independence to all the other stars, and do not bear arms against the people of the Sun, but that the two peoples do come to the help of one another's land, if an enemy do invade either;

'(3) That by way of tribute the king of the Moon do pay the king of the Sun yearly ten thousand measures of dew and, moreover, that the people of the Moon give ten thousand of themselves as hostages;

'(4) That the Moon people do make the proposed colony of

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Lucifer open to all, with intent that any one of the other peoples may take part therein.

'Such was the peace that was made. The work of demolishing the wall began forthwith, and we prisoners were restored to the Moon.

'On our arrival in the Moon our friends amongst whom was the king himself, met us and welcomed us with tears. The king invited us to remain at his court and take part in the foundation of the Lucifer colony, promising me to give me the hand of his daughter in marriage. But I was proof against persuasion and begged him to be sent down again to earth. When he saw the impossibility of altering our determination, after a week of lavish entertainment, he allowed us to go.

'Now I want to describe the strange things I noticed during my stay on the Moon.

'All Moon men live on the same kind of food. They light a fire and roast frogs, of which they have large numbers flying about in the air. Whilst the process of roasting is going on, they take seats as if round a table and snuff up the savoury steam that rises. They enjoy thus a sumptuous repast, and such is their food.

'Their drink is air, pressed into a cup, from which a dew-like moisture is distilled.

'Any of the Moon men who is bald and hairless is regarded handsome. Long-haired people are an abomination to them. In contrast, on other stars and comets, long hair is considered beautiful. I can vouch for this, because there were some visitors from comets in the Moon at the time.

'There are no women on the Moon; they are not known even by name. Instead the Moon men use boys, up to the age of 25. These boys bear children in their thighs, which swell when the child is conceived. An incision is made when the child is to be born. It comes into the world dead, but begins to breathe when exposed to air.

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'But there is also another species of Moon men, that grow like plants. The conception of this species is as follows. The right testicle of a man is cut off and buried in good soil. After some time it gives birth to a large tree with fleshy leaves which bears acorns about one cubit long. The acorn is opened when ripe and the child taken out. But these children do not possess sexual organs. These are attached later, when required. The poor use parts made of wood, the rich of ivory.

When a Moon man gets old, he does not die but dissolves in smoke.

'The Moon men do not urinate, nor do they expel the contents of the bowels, and they have no openings in their bodies serving these purposes. But they have an aperture below the buttock through which they caress the boys.

'The Moon men have small beards, though growing not on their chins, but a little below their knees. They have no nails on their feet, but are all solid-footed without toes. They have but one finger, but it grows from the rump, and is of flesh.

'When they perspire, they exhude honey and they anoint themselves with milk that also comes from their pores, and of this milk they make excellent cheeses.

'They manufacture oil from onions, which is as sweet-smelling as myrrh. Instead of wells they have vines, growing in abundance, that produce water. The grapes are like hail and whenever the wind shakes the vines the bunches of frozen grapes break, and the result is a hailstorm on our earth.

'The abdomen serves them as a pouch. In the stomach, which they can open and shut at will, they place all their necessities inside, which they want to carry with them. There are no bowels or liver within the belly, all that one can see when it is opened is a hairy and shaggy womb, where their young can find a warm refuge from the cold.

'The dress of the rich is of soft spun glass; that of the poor of

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woven copper. The Moon is rich of that metal, which they work by sprinkling it with water and spinning it like wool.'

'As to the nature of their eyes—I hesitate to relate about it lest the reader should think I am lying. A Moon man can, at will, remove his eyes and keep them at a safe place like spectacles. Then he can reinsert them. Many who had lost their own eyes, borrow others from neighbours. Those Moon men who have a store of eyes are regarded wealthy.

'Their ears are leaves of the plane tree, but those Moon men who had grown from trees have wooden ears.

'I saw two miraculous things in the palace of the Moon king. A shallow well, where if one descends into it, one can hear everything that is said amongst us mortals on earth; and a vast mirror, which reflects all that happens on earth; as clearly as if one be present on the spot. Looking into that mirror I saw my friends and all my own country, but whether or not they saw me I cannot say for certain. Those who refuse to credit my story will believe me if they some day visit the Moon themselves.

'The time came to bid farewell to the Moon king and his court. We embarked and set sail to traverse the vast expanse of air. Endymion presented me with two glass tunics and five woven of copper-wire and also with a complete suit of peas-pod armour. All this I subsequently lost when we were swallowed by the giant whale on our further voyage.

'Endymion gave us an escort of a thousand Horse-griffins for some sixty miles. On our air journey from the Moon we passed many planets without visiting them, but we put in to the star Lucifer at the very time when the colony was being settled there. Then we entered the Zodiac, and passed the Sun on our left. We did not disembark, in spite of the eagerness of my companions to do so, as the wind did not allow it. But we sailed close enough to the Sun to observe that it was a fertile, rich, well-watered country, full of many good things. When the Cloud-Centaurs, who were serving as mercenaries with the Sun king, spied us,

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they flew towards the ship, believing that we were still the Sun's enemies; but on hearing that the Moon was now in treaty with their master, departed. The Horse-griffins had turned back to the Moon and we continued sailing on a downward course, towards the earth. On the evening of the second day we arrived at the city of Lampopolis on the lower level of the Zodiac.'

CHAPTER FOUR

Science Discovers the Moon World

THE age of cosmic innocence, when the only limits to man's knowledge of the universe were his capacity to speculate and his power of imagination, came to an end with the publication of Claudius Ptolemy's famous work on the planetary system about A.D. 150. For well over a thousand years the Ptolemaic System remained the basis of cosmology. It co-ordinated and greatly widened the theory of the universe, formulated by Aristotle five centuries before. In common with the Greek philosophers, Ptolemy believed that the earth lay at rest in the centre of the universe, while the heavenly bodies revolved round it at various distances.

Although this concept was not really scientific, in the sense that such a speculative theory has to be confirmed by experiment and calculation before it can be accepted as fact, Ptolemy produced coherent though inaccurate theories on the behaviour of the planets. His main error was in stating that the earth stood still. But, at a time when the heavens could be observed only with the naked eye, it would have been absurd to assume that the earth was in motion and revolved around the sun.

Ptolemy believed that the universe was made of four elements—earth, air, fire, and water. These elements possessed tangible qualities: hot and cold which were active, dry and moist which were passive. They were held to move in straight lines: the earth downwards, the fire upwards, the water horizontally. But as the

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universe was finite, motion could not continue for ever in a straight line in space. Therefore, Ptolemy conceded the existence of a circular motion, the only one which has neither a beginning nor an end. This motion he ascribed to the planets and stars which moved in the heavens around the fixed earth. To do this the planets had to consist of yet another element to which circular motion was natural. This element was ether. It was neither light nor heavy, without beginning or end, incapable of increase or change.

Thus the seven moving planets, Sun, Moon, Venus, Mars, Jupiter, Mercury, and Saturn, moved in continuous, circular motion within their own spheres of ether through the universe, and each of the spheres was transmitted to the next, the whole space of the universe filled with the eternal, unchanging ether, without a void between the earth and the planets. But below the Moon, which the ancients knew to be the planet nearest to the earth, there was the atmosphere, fed constantly by the exhalations from the earth, the vapours and smokes of the four elements of our own inhabited world.

This concept of the universe prevailed until the 16th century. It substituted rational, if fallacious, thought for the pagan myths of gods and goddesses roaming the planets. It allowed for the possibility of reaching the planets—at least reaching the Moon through the atmosphere—and thus gave encouragement to the eternal dream of human flight which would raise man from the earth and conduct him through the divine ether towards the mysterious heavenly bodies.

It also suited the Christian dogma of a single universe created by God and provided the Church with an acceptable synthesis of faith and science.

But if the Church was prepared to accept the Ptolemaic theory, though with many qualifications, the notion of human flight into the skies was considered throughout the Dark Ages as heretical and contrary to the Christian teaching. The princes of the

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Church reminded the faithful that Christ, when tempted by Satan, did not travel alone, but awaited the safe conduct of the angels His Father sent for Him. Yet the stern warnings of the Church not to trifle with God's universe did not stem the flow of myths about the Moon in an age which was still pregnant with superstition. Legends about an inhabited Moon abounded and even the Old Testament seemed to lend weight to such belief, as in the account of the old man who gathered sticks on the Sabbath and was exiled to the Moon by Moses. The Teutonic tribes, which embraced Christianity in the seventh century, knew the Man in the Moon as a wretch who had stolen cabbages from his neighbour's plot on Christmas Eve and was banished to the Moon.

In England, Alexander Neckham, abbot, poet, and scholar, born in 1157 in St. Albans, expressed his belief that one of God's punishments for evil men was to be expelled from the earth to the Moon. As late as in the fourteenth century there was Chaucer's allusion in *Troilus and Cresida* to this form of retribution, a statement sternly rebuked by Dr. Reginald Peacock, bishop of Chichester.

In Catholic France, the belief among the peasants that Judas Iscariot was transported to the Moon prevailed for many centuries, and indeed has lingered to the present day.

In Italy, Cain was put on the Moon for Abel's death: Dante wrote:

"For now does Cain with fork of thorns confine
On either hemisphere, touching the wave
Beneath the towers of Seville.
Yesternight the Moon was round.
But tell, I pray thee, whence the gloomy spots
Upon Moon's body, which below on earth
Give rise to talk of Cain in fabling quaint?"

The Church always viewed with disapproval ideas that there might be life on other planets, which had not originated in the

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Garden of Eden. Yet there were some princes of the church who dared to defend the heresy that the planets, or at least the Moon might be inhabited.

In the early fifteenth century, when the Inquisition raged in Europe, especially in Spain and Germany, Cardinal Nicolas of Cusa, Bishop of Brixen, stated in his *De docta Ignorantia* that no one was entitled to exclude the possibility of life on any star "because the earth was a star among many stars in God's Universe".

Cusa could afford to venture such radical opinions, including his contention that the earth revolved, because he enjoyed the friendship and protection of Pope Eugene IV.

Not only the Roman church forbade the faithful to speculate about the nature of God's creation. Most of the leaders of the Reformation were even more strongly opposed to such blasphemous examination of His works. John Galvin's doctrine of predestination implied that God, the creator, was "an almighty or omniscient person", arbitrary in His acts and separate from his creatures. What God did not give man, man could not create, and therefore man could not invent wings to fly without committing sacrilege.

Fortunately some of the leaders of Protestant thought were less rigid in their outlook. Galileo, Kepler, Giordano Bruno, and Tycho Brahe all found support outside the Church of Rome. Nevertheless, the theory of Copernicus, a contemporary of Calvin, that the sun and not the earth was the centre of the universe was regarded as heretical by both Rome and the Reformers, despite the fact that Copernicus described his discoveries as hypothetical and dedicated his main work to Pope Paul III. His publisher, Osiander, attempted to appease Luther and Melanchton, the two great German leaders of the Reformation, by adding a preface in which he tried to soften the impact of everything that Copernicus had proclaimed.

It was not until 1577 that Tycho Brahe undermined the

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Ptolemaic system, and Aristotle's theory of the ethereal planets, by arguing that the earth moved round the sun in a circular orbit, and that the planets were solid bodies. The disintegration of the ideas which had been accepted for two thousand years continued when Johannes Kepler showed that, in fact, the planets moved in elliptical orbits around the sun.

Final victory over the ancient concept of the Universe came with the invention of the telescope which enabled Galileo to lay the foundations of modern astronomy. The time had arrived for rational scientific observation of the heavens. As a result Galileo was dragged before the Holy Inquisition, forced to recant his belief in the correctness of Copernicus's findings, thrown into prison and probably tortured. But the veil in the sky was beginning to be lifted.

Having established that the planets were solid, the seventeenth-century astronomers certainly did not reject the possibility that some of them, in particular the Moon, might be inhabited. On the contrary, they were inclined to believe that life did exist within our solar system.

The world was slow in coming to terms with the revolutionary theories of Copernicus, Kepler and Galileo; the belief that the earth, the home of man who was made in the image of God, must be the centre of the universe was deeply rooted.

Kepler's famous three laws of planetary motion were scientifically cautious deductions based on observation of the skies. He did not formulate a cosmic theory and his discoveries remained unco-ordinated until the genius of Newton gave the explanation of universal gravity and showed that the same force which made an apple fall to the ground held the Moon in its orbit.

The possibility of life on the Moon was seriously considered by Kepler, who died only thirteen years before Newton was born. As a student of Tuebingen, in 1593, Kepler wrote several treatises in which he presupposed Moon dwellers "of some species related to man or beast", and in 1609 he completed the first version of his

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Dream about the Moon. This he rewrote in 1629, having just read Plutarch's *Face in the Moon* for the first time.

He did not attempt to publish this work for weighty personal reasons. His mother had been accused of witchcraft and imprisoned as a sorceress and heretic. Indeed she might well have ended her life at the stake but for Kepler's friendship with the influential Duke of Hesse. If it sounds fantastic that there were still witch-hunts in Germany, in an era which saw dramatic progress in science and unsurpassed artistic achievements in Western Europe, it should be remembered that this was also an age of savage religious strife.

Born of a Protestant family, Kepler served as Mathematician Royal to the Catholic Emperor Ferdinand II and had at all costs to avoid offending Wallenstein, the Emperor's war-lord, a man notorious for his persecution of Protestants. In his "Dream", Kepler touched upon many of the religious controversies which, shortly before his death, were to lead to war between King Gustavus Adolphus II of Sweden and the German Emperor. The sympathies of the astronomer appeared to be with the Reformation, but he carefully avoided a break with Wallenstein, his Catholic benefactor at the Court, and his "Dream" was published by his son Ludwig, four years after his death.

Although romantic, even mystical, in tone, it is also a complex, and in parts a highly technical astronomical treatise. Kepler's guide to the Moon was a demon and, as in Plutarch, the journey itself was performed by supernatural means. However, once the Moon was reached, the scientist took over. His description of the topography of the Moon was the result of telescopic observation. He had been a friend and pupil of Tycho Brahe, and he worked for some years with his master on the Island of Hveen. There, Brahe, through the patronage of King Frederick II of Denmark, had established the world's first scientific observatory.

The telescope as such was invented in Holland, but Galileo was the first man to construct an instrument capable of viewing

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the stars efficiently. On the very first night he used it, January 7, 1610, he discovered three of Jupiter's satellites. The telescope he constructed in 1611 remained by far the most effective apparatus until Newton built his mirror telescope in 1671.

As a result of his work with the new telescope, Kepler was able to give accurate accounts of many natural phenomena in his *Dream about the Moon*. Much of this appeared in his serious studies such as *Astronomianova* and *Dioptrice*, but the "Dream" has often been described as a popular compendium of his life's work. No modern English translation of the "Dream" exists, and the following excerpts are taken from the German original published in Frankfort in 1634. Kepler wrote in the first person, but he disguised himself under the name of Duracoto, a native of Thule, the legendary island of the ancients. In fact it was Iceland, but Kepler probably saw it as one of the Shetland Isles.

In the story there are many autobiographical allusions: Duracoto's mother, Fiolxhilde, was a sorceress with supernatural powers and she taught the boy to collect rare herbs on Midsummer night. After strange incantations, she sewed them into little pouches made of goatskin for sale to sailors as a protection against ill-winds and shipwreck. One day, driven by curiosity, Duracoto opened one such pouch. This so outraged his mother that she sold him to a skipper as a deckhand. The ship set sail for Denmark, and the boy became ill during the journey. He was put ashore on the Island of Hveen, where the great astronomer, Tycho Brahe, lived among his instruments. Brahe took the bedraggled youngster to his house and began to teach him the secrets of astronomy. "Thus," wrote Duracoto, "though I was a half savage, I was introduced to the most divine of sciences."

He remained for some years with Brahe, who later sent him to Copenhagen to study in the college there. After five years he returned to his native island. Reunited with his mother, he now realized that she did indeed possess some knowledge of secret things. She told him that on their cold, dark, remote island, they

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were nearer to the "wise spirits" who disliked the light and bustle of the civilized world, which Duracoto had seen for himself. There were, she said, nine spirits and Kepler listed them in a foot-note : metaphysic, physic, ethic, astrology, optic, music, geometry arithmetic, and astronomy "the most pure and gentle of all".

Fiolxhilde confided in her son that the good demon of astronomy had often visited her and, on several occasions, had taken her "to far-away coasts and other worlds", which her son knew only from hearsay or study. She told him about Levania. It was the most beautiful world of all and although she herself had never been there the demon from the stars had often told her of it. Levania, as Kepler knew, is very close to the Hebrew words for the Moon, Lebana or Levana.

Duracoto listened with enthusiasm and begged his mother to summon the spirit so that he could hear for himself about this strange world and how to travel there. At first she demurred, but one spring night, as the Moon waxed and Saturn stood in the sign of Taurus, Fiolxhilde led her son to a crossroads (the symbol for the vernal equinox) where she intoned her incantations. After performing some further ceremonies, she then sat down with her right hand outstretched. With their heads completely covered, mother and son heard the whisper of a hoarse, unearthly voice, not of this world, but one which spoke in the language of the island of Thule. This is the story which Duracoto heard in his dream.

"Fifty thousand miles away in the ether lies the Island of Levania. The voyage is extremely difficult and dangerous for those who dwell on earth, but for us it is easy and can be accomplished in four hours, although we are not free to embark upon the journey when we choose. We must wait until the Moon begins to wane, and our voyage must be completed before she radiates once again in the full glory of her light. Thus we can only take a few earth dwellers with us on this journey, only those who are completely devoted to us."

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'The beginning of the journey is the most difficult part for a human because it is as if he were being catapulted by gunpowder over mountains and oceans. Therefore an earth dweller must be drugged with a potion which will prevent his limbs being torn from his body. Then there is the tremendous cold and breathlessness to be endured; for the latter one has to hold a wet sponge over nose and mouth. After the first part of the journey, travelling becomes easier and we leave the earth dwellers to travel on alone. Indeed, we must hurry on ahead to help them in their dangerous landing which could injure them severely, so tremendous is the impact.

'When the earth dwellers awake from their sleep, they complain of great exhaustion and their recovery, to the point where they can walk again, is slow.

'Now I shall tell you something of the world in the Moon. Although the view of the universe is the same from the Moon as it is from the earth, the movement and size of the planets look quite different. The Moon consists of two hemispheres, the Sub-Volva, which is turned towards the earth, and the Pri-Volva, which is turned away. From the earth only one of the Moon's hemispheres can be observed, and similarly, the Volva, which is Levania's moon, can be seen only from the Sub-Volva, while the Pri-Volva is for ever deprived of the sight of the Volva. The two hemispheres are divided by a circle which runs through the poles. It is called the Divisor.

'In this world, day changes to night as on earth, but night and day are of almost equal length throughout the year, although the day is somewhat shorter in Pri-Volva and the night of Sub-Volva is a little longer. One day and one night last almost a month by our calendar because the Moon dwellers see the sun only twelve times a year, whereas we see it 365 times. To be more exact, it takes them nineteen years to see the dawn 235 times.

'Although the Moon has seasons, summer and winter are entirely different from those on earth. At the lunar poles there are

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six days of summer and six of winter, each day being as long as one of our months; but near the Divisor the change from summer to winter is barely noticeable. To the Pri-Volvans the sun seems much larger at noon than at dawn, but to the Sub-Volvans the midday sun is much smaller than at sunrise. We might describe the climate in Sub-Volva as temperate. In Pri-Volva it is inclement. The Pri-Volvan night, which lasts for 15 to 16 of our days, is of fearful darkness, like a moonless winter night on earth, because Pri-Volva is never lit by the rays of the Volva. The whole hemisphere is covered with ice and snow and ravaged by terrible gales and storms.

'Then, after 16 days, comes one lunar day as long as fourteen earthly days. During this time the sun, which is huge, rises and sends down glowing rays whose burning strength is undiminished by winds. This causes unbearable heat in Pri-Volva, perhaps fifteen times greater than in the middle of Africa, only to be followed again by frost which is much worse than anything we know on earth.

'To the lunar beings, their moon, the Volva, stands immovable in the skies as if fixed to heaven with an enormous nail. Behind it move the planets and the sun, from east to west. As with the Moon which we see, the Volva waxes and wanes according to the light it receives from the sun. But the process which takes a month on earth is completed on the Moon within a day and a night. Moreover the Moon seen by the inhabitants of Sub-Volva, never disappears completely. Even during the period called new moon by people on earth, the dwellers of Sub-Volva receive light from the Volva. Indeed they call the New Volva midday, the Full Volva midnight, the first quarter evening, and the last quarter morning.

'For the Sub-Volvans one day may last for fifteen or sixteen of ours and during it they enjoy the extremely hot bright rays of the sun; but this is a doubtful privilege in that the heat also causes the oceans to leave their beds and to flood all the land. When, at last,

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night descends upon Sub-Volva, the waters recede from the fields and flow to the other hemisphere which is arid and plagued by frost. And now Pri-Volva is flooded.

'Although the Moon World is only 1,400 miles in circumference, a quarter the size of our own, it has high mountains, deep, precipitous valleys and it contains numberless caves, caverns, and underground hollows, particularly is this so in Pri-Volva.

'In these caves the inhabitants of the Moon seek refuge from the terrible heat, frosts and floods of their world.

'Everything that grows in the soil of the Moon is of enormous size and, though growth is rapid and vegetation reaches huge proportions, all things have only a very short life.

'The Pri-Volvans have no settled homes. During a single day they may wander, in large herds, right across their hemisphere. They use their legs, which are longer than those of camels, or flutter about with their wings, or sail in their boats upon the waters of the floods, or creep into the caves and hollows for protection. Some of the moon-dwellers, who have fish-like bodies, find respite from the heat of the sun in the cool waters of the oceans and rivers. Most of the people of the Moon are divers and all breathe very slowly so that they are able to spend a long time under the surface of the water.

'In the deepest parts of the waters there is eternal frost but the shallower parts are warmed by the rays of the sun. The wandering Pri-Volvans gather sea food from the waves when the creatures which live in the oceans come up to enjoy the warmth. In the Sub-Volva there are cities, villages, and gardens; the Pri-Volva, during the dry period, is desert and forest.

'The moon-dwellers channel the warm water of the oceans and rivers to their homes through narrow canals. As the water flows through these long canals it is gradually cooled. The moon-dwellers use it for drinking, but when night descends again they have to leave their abodes to hunt for food.

'The moon-dwellers are furry beings, indeed fur makes up the

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larger part of their bodies, which are spongy, puffy and porous. If a moon-being is caught unawares by the great heat of the day, his fur is singed and becomes hard and brittle so that in the evening it drops off.

'All that the soil produces comes to fruition and dies in a single day, yet every morning all things grow anew.'

'Most moon-dwellers have serpentine bodies and enjoy lying in the mild heat of the morning or evening sun although they always do this near their homes and creep inside quickly when the sun grows hotter. Some die from the heat, but come to life again during the night, unlike our flies.'

'All over the Moon lie great masses of acorns. The scales of these cones are burnt by the sun during the day. Then, in the evening, the cones open and new moon-dwellers are born.*'

Kepler ends his story in this time-honoured fashion: 'At that moment a wind rose outside and the beginning of a heavy down-pour disturbed my sleep. Thus I had to leave the demon and his tales, and Duracoto and his mother Fiolxhilde. I returned to myself, to find my head pressed against my pillow and my body wrapped tightly in my bedclothes.'

* Here Kepler borrowed from the "Reports" by Julius Caesar Bordone de la Scala (1484-1588), an Italian writer, who stated that ducks were born from resin spread on ships' timbers and heated by the sun. Bordone maintained that he himself had seen insects being bred in this way in the warm sap of juniper trees. He also described a similar process of animal reproduction from "the berries of a tree in Scotland".

CHAPTER FIVE

The Bishop's Tale

A NINETEEN-YEAR-OLD Oxford undergraduate wrote the world's first realistic, if light-hearted, tale of a journey to the Moon. He was a young man destined to rise to considerable heights in the reign of Queen Elizabeth I. The records of Christ Church described him as "one of the most ingenious persons as well as assiduous students in the university".

Yet he never published the story which was to become one of the great classics of imaginary voyages. By the time he fell into the "low and languishing disease" from which he died in 1633, he had probably quite forgotten the manuscript which he doubtless regarded as the trivial prank of a student.

Francis Godwin was born in 1562 in the humble home of a country parson at Harrington, Northamptonshire. When he was sixteen he went to Oxford where he became, in quick succession, a Master of Arts and a Doctor of Divinity. Being without high connections, however, he had to content himself with the modest living of a rectorship in Somerset, from which he later obtained preferment to a subdeanery at Exeter.

In the calm of the West country this talented priest cultivated the art of history. His *Catalogue of the Bishops of England* and *History of the Church since the first planting of Christian Religion in this Island* have been quoted ever since he wrote them. They were so highly esteemed by his contemporaries that Queen Elizabeth gave him the Bishopric of Llandaff when he was thirty-nine.

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This royal reward afforded him a title but little substance. The small Welsh diocese produced only £150 a year. However, it enabled him to continue writing and he produced histories of the reigns of Edward IV, Edward VI, and a book on the life of Queen Mary. Wood described him as "a good man, a grave divine, skilful mathematician, excellent philosopher, pure Latinist and incomparable historian". He was, moreover, by no means wholly unworldly. In 1607 he wrote to Sir Thomas Lake, begging "his interest to procure him the See of Gloucester", a rich diocese, and offering the nobleman a reward of eighty pounds "for his interest". He did not obtain it, but when he dedicated his new edition of the "Catalogue of Bishops" to James I, the king marked his pleasure by translating Godwin to the Bishopric of Hereford.

Even in later life, long after becoming "a grave divine", Godwin showed high spirits. When, in 1627, he was asked by the Privy Council to apprehend two Romish priests, he mounted a horse and chased the two Papists across the countryside with great enthusiasm. Eventually, however, he had to report that "though I used all means of pursuit, it was without effect".

Godwin was probably the first English writer to compile a textbook on espionage. It was called: *Statement of a Project for Conveying Intelligence into besieged towns and fortresses and receiving Answers there from.* He also wrote what amounted to a romantic thriller, *The Mysterious Messenger*. This, like his *Man in the Moon*, he kept in manuscript form until he died. Both were published posthumously, at about the same time.

His *Man in the Moon* or *Discourse of a Voyage to the Moon*—by *Domingo Gonsales* was almost certainly not written because of his interest in the physical universe. In his later writings he hardly ever touched upon the subject again although, like all educated men of the Elizabethan era, he was fascinated by "mathematics". The young Oxford student was simply writing in the picaresque tradition. His hero Domingo Gonsales was, in essence, an Elizabethan buccaneer. His voyage to the Moon was very much of

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its time. It told of an impoverished Spanish nobleman who went to the wars and it developed into the story of a shipwrecked mariner.

Immediately the first edition was published it became a success, being particularly popular in France, where it appeared in 1648 under the title *L'Homme dans la Lune*, having been translated by Jean Baudoin.

Indeed, for at least two centuries the book was believed to have been the work of a Frenchman, as Godwin's name did not appear on any of the earlier English editions, the first of which was published five years after his death. Jules Verne and Edgar Allan Poe both regarded the story as the work of an anonymous French or Spanish author. Not until an American literary historian, Grant McColley, republished the original English manuscript, from an apparently unique copy in the British Museum, was it realized that the *Man in the Moon* had been written in England.

Godwin began his work with a lengthy autobiography of his hero. Domingo Gonsales was born in Seville, the youngest of seventeen children of a nobleman. His father sent him to the University of Salamanca to study for priesthood, but the young man decided otherwise. He sold his books and chattels for thirty ducats, bought a nag and made off to Antwerp to join the army of the Duke of Alba, who commanded the Spaniards in the Low Countries, in 1568. He fought at Cambray; killed a knight and plundered him of his gold chain and other possessions, for which he received 200 ducats. He gathered more loot and returned home from the wars with 3,000 crowns in his pocket, being received with joy by his parents, "when they found that I was now able to maintain myself, without being a burden to them". His parents arranged a suitable marriage to the daughter of a rich Lisbon merchant and his wife brought a rich dowry. But the bliss was soon shattered by a quarrel with one of his relatives which resulted in a duel and in which Gonsales killed his adversary. Forced to fly, he embarked for the East Indies, leaving his wife

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and children behind, but taking with him 2,000 ducats. With this capital he established himself as a prosperous merchant and, after a few years, having acquired a stock of diamonds, emeralds and pearls, "bought at easy rates", he decided to return home and rejoin his family. But on his journey home he fell dangerously ill and the ship's captain decided to land him on the island of St. Helena, where "the healthfulness of air and the fruitfulness of soil was to assist his recuperation". A negro, Diego, accompanied him as a servant.

On St. Helena he found the "Gansas", the huge birds which were to take him to the Moon. This is how Gonsales tells of his discovery.

"In February and March there are to be seen on this happy island huge flocks of a kind of wild swans. I easily tamed them by only muzzling them, so that unless they came to me or Diego they could not feed. Diego lived in a cave on the west of the island, and if I wanted to communicate with him, I would take one of the muzzled and hungry Gansas and, tying a note to his neck, beat it from me. Thereupon it would go away to Diego's cave, and in the same manner, my servant would dispatch the bird to me.

"The Gansas fed near the mouth of the river both upon fish and birds. They were breeding in infinite numbers. I took thirty or forty of them young, and bred them by hand, just as a recreation, though not without some thoughts of an experiment, which had began to exercise my mind, and which I after put into practice.

"The birds were very strong and able to continue in great flight. I taught them to come at a call from afar, not using any noise but only by showing them a white cloth.

"It is wonderful to think what tricks I taught them before they were three months old. Among other things I used them, by degrees, to fly with burdens, wherein I found them able beyond belief. A white sheet displayed by Diego on one side of the hill

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made them carry, from me to him, bread, flesh or whatever I pleased, and upon a similar signal they came to me again.

'Having proceeded thus far, I considered how to join a number of them together, so as to carry a heavier weight. I thought it might enable a man to be carried safely in the air from one place to another. I puzzled my wits extremely with this thought.

'Upon trials I found that if many of these Gansas were put to the bearing of one great burden, it was impossible that all of them should rise together just at one instant. The first that rose would find himself stayed by weight heavier than he could stir, and he would soon give up, and so the second, third, and all the rest.

'At last, I contrived a way whereby each might rise with only his own proportion of weight. I fastened about each Gansa a little pulley of cork, and putting a string of a just length through it, I fastened one end to a block of almost eight pounds weight, tied a two pounds weight to the other end of the string and then causing the signal to be given, they all rose together, being four in number, and carrying away my block to the place appointed.

'This accomplished so luckily, I added two or three birds more and made them carry a lamb, which I much envied, it being the first living creature to partake of such an excellent device.

'At length, and after many trials, I was filled with great longing to cause myself to be carried in the same manner into the air. Diego, my Moor, was likewise possessed with the same desire and had I not loved him well and wanted his service, I should have resented his ambitious thoughts. For I count it a greater honour to have been the first Flying Man than to be another Neptune who first adventured to sail to sea. Pretending not to understand his intention, I told him that all my Gansas were not strong enough to carry him, being a man twice heavier than myself.

'Having prepared all necessaries, I placed myself and all my utensils on the top of a rock at the river mouth, and putting myself upon my engine, I ordered Diego to give the signal.

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Wherupon my birds, twenty-five in number, rose all at once and carried me lustily to the rock on the other side, being about a quarter of a league away. When I was once over my heart swelled with joy and admiration at my own invention. How I did wish myself in the midst of Spain and that I might fill the world with the fame of my glory. I felt a great longing for the coming of the Indian Fleet to take me home with them. . . .

'At last, after three months, they arrived—three Garricks, much weather beaten, the sailors sick and weak. They stayed to refresh themselves on our island for a whole month. The admiral was called Alfonso de Xima, a valiant and wise man, worthy of better fortune than afterwards befell him.

'To him I disclosed my device of the Gansas, realizing that it was impossible otherwise to persuade him to take so many birds into his ship. Yet I adjured him, by oaths and persuasions, to keep the secret, though I did not doubt that he would not dare to impart the experiment to anybody before our king were acquainted with it. But I had much apprehension that the desire of gaining for himself the honour of so admirable an invention might tempt him to make away with me. However, I was forced to take this risk unless I would venture the loss of my birds, the like of which, for my purpose, were not to be had in Christendom.

'As it happened, all these doubts were causeless. On Thursday, June 21, 1599, we sailed for Spain. After two months we met with an English fleet, about ten leagues off the island of Teneriffc. We had aboard five times their number of men, all in good health and well provided with ammunition, yet finding the English resolved to fight, we decided it better to escape.'

The ship escaped the English but met with disaster: she struck a rock and split to pieces. Gonsales, envisaging the shipwreck, had decided to leave the ship just in time. He put his little casket with the jewels into his sleeve, harnessed the Gansas to his engine, and took off into the air, just in time. Though he was "miserable to

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behold the brave sailors in the woeful distress", he ~~saw~~ them saved by the English, who had pursued the Spanish Carrick and "showing a generous temper, launched their cockboats and rescued my friends from the fury of the waves".

The Gansas had carried the flying machine to the island of Teneriffe where Gonsales was confronted by a troop of savages. But before they could do him harm, he managed to take off again from a white cliff upon which the Gansas had put him down, and thus began his flight to the Moon, the tale of which the author begins in a dramatic fashion:

'Now, reader, prick up thy ears and prepare thyself to hear the strangest chance that ever happened to any mortal, and which I know thou will not have the grace to believe till thou sees the like experiment—which, I doubt not, in a short time may be performed !

'My Gansas, like so many horses that had gotten the bit between their teeth, made not their flight towards the cliff I intended, but with might and main took me towards the top of the Pike mountain and never stopped till they came there—a place fifteen miles in height. When I was set down there my poor Gansas fell to panting, blowing and gasping for breath, as if they would all have died, so I did not trouble them for a while. But little did I expect what followed.

'It was now the season that these birds take their flight away, as our cuckoos and swallows do in Spain towards the autumn. When I began to settle myself and to take them in, they rose up, and having no other higher place to make towards—to my unspeakable fear and amazement—struck bolt upright, still higher and higher.

'For an hour, I guessed, they never left to wing upright, after which they laboured less until, at length, they remained immovable.

'Neither I nor the engine moved at all, but continued still as if

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not having weight at all. I found then—what no philosopher ever dreamt of—that those things we call heavy do not fall towards the centre of the earth, but are drawn by a secret property of the globe, or rather something within it, as the load-stone draws iron which comes within the compass of its beams.

'For though my Gansas could continue unmoved without being sustained by anything but the air, as easily as a fish in water, it is impossible to imagine with what swiftness they were carried either upward, downward or sideways.

'The next thing that disturbed me was the swiftness of the motion, which was so extraordinary that it almost stopped my breath. If I should liken it to an arrow out of a bow, or a stone thrown down from the top of a high tower, it would come vastly short of it.

'Another thing was exceedingly troublesome to me: the illusion of devils and wicked spirits who came about me in great numbers, in the likeness of men and women, wondering at me like about an owl, and speaking several languages which I understood not, till I met some who spoke good Spanish, some Dutch, and others Italian, all of which I did understand.

'Now, though my Gansas were entangled in my lines, they easily seized upon diverse kinds of flies and birds, especially cuckoos and swallows, of which there was a multitude—like moths in the sun. But I never saw the Gansas eat anything.

'I was much obliged to those, whether men or devils, I know not, who told me: if I would follow their directions I should not only be carried safe home, but be assured to command at all times the pleasures of that place.

'Not daring to give a flat denial, I entreated them to help me with some victuals, lest I should starve on my journey—though I felt no hunger at all. They readily brought me some flesh and fish, it was extremely fresh without any relish of salt. Wine likewise tasted as good as in Spain and the beer was no better in Antwerp.

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'I shall now describe the place wherein I was. The clouds I saw were all between me and the earth. The stars, because it was always day, I saw at all times not shining bright—as we see them at night—but of whitish colour, like the Moon in the day time. As for the Moon, she appeared of a huge and dreadful greatness.

'The air in that area I found without any wind and exceeding temperate, neither hot nor cold. The sunbeams had no object to reflect upon, nor were the earth and water so near as to affect the air with their natural qualitics of coldness.

'Lastly, I felt neither hunger nor thirst; whether the purity of the air, freed from the vapours of the earth and water, might yield sufficient nourishment, or what else might be the cause, I cannot determine, but I was perfectly in health both of body and mind, and even above my usual vigour.

'Some hours after the departure of that devilish company, my Gansas began to bestir themselves, still directing their course towards the Moon, making their way with such incredible swiftness that I conceived they advanced little less than fifty leagues an hour.

During the passage I observed three things very remarkable: one that the farther we went the less the globe on the earth appeared to us and that of the Moon grew still larger; then that the earth seemed to mask itself with a kind of brightness like another moon; and finally, as we discern certain spots and clouds on the Moon, so did I then see the like on the earth. But whereas the forms of the spots in the Moon are always the same, these in the earth seemed to change evry hour. The reason seems to be that the earth turns round upon her own axis every four-and-twenty hours from west to east. Thus, I should at first see in the middle of the earth a spot like a pear with a morsel bit out on one side, in some hours I should observe this spot move away towards the east. This no doubt was the mainl:nd of Africa. Then I might perceive a great shining brightness and it was unquestionless the vast Atlantic Ocean. After this came a spot almost oval. iust as we

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see America described on our maps, then another immense clearness representing Mare del Zur, or the South Sea, and lastly a number of spots—the countries and islands of the East Indies.

For eleven or twelve days I was carried directly towards the body of the Moon, with such a violent whirling as is incomprehensible.

'After eleven days passage in this violent flight, I perceived that we began to approach to another earth—this being the globe or very body of the star which we call the Moon.

'The first difference I found between this and our earth was that it appeared in its natural colours, whereas with us, a thing a league or two away from us puts on that deadly colour of blue.

'I then perceived that this world was to the greatest part covered with a mighty sea; those parts only being dry land which are to us somewhat darker than the rest of the body—I mean what country people call "The Man in the Moon". That part which shines so bright is another ocean besprinkled with islands.

'After I was free from the attractive beams of the earth, I found the air altogether serene, without winds, rain, mists or clouds, neither hot nor cold, but constantly pleasant, calm and comfortable till my arrival in that "New World of the Moon".

'On Tuesday, September 11—at which time the Moon being two days old was in the twentieth degree of Libra—my Gansas rested for some hours and then, in less than an hour, set me on the top of a high hill in that other world where many wonderful things were presented to my sight.

'First, I observed that all things on the Moon were ten, twenty, even thirty times larger than ours. Their trees were thrice as high and five times broader and thicker. So were their herbs, birds and beasts, though I cannot well compare them to ours because I found not any kind of beasts or bird which resembled ours, except swallows, cuckoos, woodcocks, bats, and some kind of wild fowl. And likewise, such birds as my Gansas.

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'No sooner was I upon the ground than I found myself extremely hungry. Stepping then to the next tree, I fastened my engine and Gansas thereto and, in great haste, began to examine my pockets for the victuals. But to my great surprise and vexation, instead of partridge and capons, which I thought I had hoarded there, I found nothing but a medley of dry leaves, goats' hair, sheep or goats' dung, moss and the like. My Canary wine was turned and stunk like horse piss. Oh, the villainy and cheat of these cursed Spirits !

'While I stood musing, I heard of a sudden my Gansas fluttering behind me and looking back I saw them falling greedily upon a shrub, whose leaves they fed. I had never seen them eat any green thing, so stepping to the shrub I put a leaf to my mouth. The taste was excellent, though I cannot express it.

'Scarce had we ended our banquet when I saw myself surrounded by a strange kind of people, both in feature, manners and apparel. Their stature was very different, but they were generally twice as high as ours; their shape and countenance pleasant, their habit hardly to be described, for I never saw either cloth, silk nor other stuff like that whereof their clothes were made.

'Neither can I relate their colour, it was neither black, white, yellow, red or blue, nor any colour composed of these. It was a colour never seen in our earthly world. It is hard to make a man born blind understand the difference between green and blue, so neither can I decipher this Moon colour. I can only say it was most glorious and delightful that can be imagined.

'Being surprised at the appearance of these people so suddenly, I crossed myself and cried out: "Jesus Maria." No sooner was the word "Jesus" pronounced that young and old fell all on their knees, holding up their hands and repeating certain words which I understood not. Presently rising again, one much taller than the rest came and kindly embraced me, ordering some of the others to attend to my birds. He took me by the hand and led me to his dwelling down towards the foot of the hill.

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'It was a building so great and beautiful as nothing in our world is comparable thereto. Yet, afterwards, I saw such buildings that this one seemed but a cottage. There was no door less than thirty feet high and twelve feet broad, the rooms were forty or fifty feet in height. Neither could they be much less, the master of the house being twenty-eight feet high and, I suppose, his body would weigh twenty-five or thirty of ours.

'After I had rested with him for about one of our days, he led me five leagues off to the palace of the Moon prince.

'The prince was much taller than my host and was called (as near as I can by letters describe it, for their sounds are not perfectly to be expressed by our characters), Pylonas, which is in their language "First" or "Chief". Though there is yet a "Supreme Monarch" amongst them, much greater in stature than he, commanding over all that whole world, having under him twenty-nine other princes. Every one of these has twenty-four "Governors" of whom this Pylonas was one.

'The first ancestor of this great monarch came out of the earth, and by marrying the heiress of that vast Moon monarchy, obtained the government. His posterity enjoyed it ever since, for forty thousand moons, which is 3,077 years. His name was Irdonozur, his heirs to this day assume the same name. He reigned for about four hundred moons, begot many children, and returned (though by what means they do not know) to earth.

•Many of the Moon-men live wonderful long, even beyond belief, some survive thirty thousand moons, which is more than two thousand years.

'The taller people are of stature, the more excellent are their endowments of mind and the longer they live. Their stature is very different: there are great numbers not exceeding ours, who seldom live about a thousand moons, which is four-score of our years. These they consider base, unworthy creatures, but one degree above brute beasts and they employ them in mean and

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servile occupations, calling them "bastards", "counterfeits" or "changelings".

'Those whom they consider "True Lunars" or "Moon Men" exceed ours generally thirty times, both in quantity of body and length of life.

'The manner of our travel to the palace of Pylonas was more strange and incredible than anything we have related, for there were delivered to each of us two feather fans, like those our ladies in Spain cool themselves with in summer. You must understand that the globe of the Moon has an attractive power, but so much weaker than the earth, so that if a man do but spring upward with all his strength, he will be able to mount fifty to sixty foot high, and being above all attraction from the Moon, he falls down no more.

'By the help of these fans, as with wings, they convey themselves in the air in a short space whither they please. In two hours' time we were carried through the air those five leagues, in all about sixty persons.

'Arrived at the palace of Pylonas, I was called in to him by his attendants.

'I found him sitting in a magnificent chair of state, with his wife or princess on one hand and his eldest son on the other, attended by ladies and young men, and all along the side of the room stood a great number of handsome personages, scarcely one lower in stature than Pylonas, whose age they report is now one-and-twenty thousand moons.

'At my entrance I fell on my knees and, taking out my jewels, I presented to the prince the stones, a diamond, a ruby, an emerald, a sapphire, a topaz and an opal, which he accepted with joy and admiration. Then I offered his queen and prince some others, but Pylonas forbade them to accept any, for he would have me reserve them for Irdonozur, his sovereign. He then embraced me and inquired diverse things by signs, which I answered in the same manner. He then delivered me to the guard of a hundred

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of his giants, strictly charging them that I should want nothing. He told them that they should suffer none of the "Dwarf Lunars" of "Little Moon Men" to come near me, and that I should be instructed in the Moon language, and lastly that they should by no means impart to me the knowledge of several things by him specified. What they were I could not understand.

'I was provided with all necessities as my heart could wish, so that I seemed to be in a paradise,

'The time came when all people of our stature must need sleep, thirteen or fourteen days, for by a secret and irresistible decree of nature, when the day begins to appear and the Moon is enlightened by the sun beams (which is in the first quarter of the Moon) all people of our stature inhabiting these parts fall into a dead sleep.

'They are not possible to be wakened till the sun sets, for as owls and bats with us, they cannot endure the light.

'During that time there is twofold light, one of the sun which I could not endure, and another of the earth. Now that of the earth was at the height, for when the Moon is at the change, then the earth is a full moon to them, and as the Moon increases with us, so the light of the earth decreases with them. I found the light, though the sun was absent, equal to that with us in the day when the sun is clouded.' But towards the quarter it daily diminished, yet leaving still a competent light, which seems very strange. They report that in the other hemisphere of the Moon, contrary to that I fell upon, during the half-moon they see not the sun, and the earth never appears to them.

'Of the "True Lunars" or "Moon Men" there are three kinds, some a little taller than we, perhaps ten or twelve feet high. These can endure the day of the moon, when the earth shines, but not the beams of both, and so they must then be laid asleep. Others are twenty feet high or above, they can suffer all the light both of the earth and the sun.

'It was then about the middle of September when I perceived

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the air more clear, and with the increase of the light I began to feel first dull and then heavy with sleep. At length, delivered myself into the custody of this sister of death, whose prisoner I was for almost a fortnight after. Awakening I found the faculties both of my body and mind brisk and vigorous. I then applied myself to learning the Lunar language, which is very difficult, since it has no affinity with any other I ever heard and consists not so much of words and letters as tunes and strange sounds which no letters can express.

'There are words which signify several things and are distinguished only by their sounds, which are sung as it were, and many words consist of tuncs only, without words. Notwithstanding these difficultics, within two months I attained to such knowledge that I understood most questions demanded of me, and with signs and words made reasonable shift to utter my mind. Pylona's often sent for me and was pleased to inform me of many things my guardians dared not to disclose, though they never abused me with any untruth. If I asked them a question they were unwilling to answer, they would shake their heads and with a shrug divert to some other discourse.

'After seven months the great Irdonozur, making his progress to a place about two hundred leagues from the palace of Pylonas, sent for me. But he would not admit me to his presence but conversed with me through a window, where I might hear him, but not see, whilst he could hear and see me at pleasure. I presented him with the remainder of my jewels which he thankfully accepted, saying that he would reciprocate with gifts of far more considerable value.

'The gifts Irdonozur bestowed on me were such that a man would part with mountains of gold to purchase them. They were all stones, three only in number, one called "poleastus", another "machrus" and the third "ebelus".

'The first is about the size of a hazelnut, very much like jet, and among many incredible virtues has the property that

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being once put in fire, it ever after retains great heat. There is no outward appearance of this heat, which stays till quenched with some kind of liquor, which in no way damages the stone even if heated and cooled a thousand times. The heat is so vehement that it will make any metal within a foot of it red hot, and put in a chimney warms the room as if a great fire were kindled therein.

“The “machrus” is yet more precious, in colour like a topaz, so clear and resplendent, though not above the bigness of a bean, placed at night in the midst of a large church it makes all the light as if a hundred lamps were hanged round.

“Yet my “ebelus” is so excellent that it may be preferred to both the others and I prized it above all the diamonds, sapphires, rubies, and emeralds that our world can afford. Its Lunar colour is so exceedingly beautiful that a man would travel a thousand leagues to behold it. Its shape is somewhat flat, of the breadth of a piece of Eight and twice the thickness. One side is of a more Orient colour than the other. Clapped to a man’s bare skin, the stone takes away all the weight of his body. Turning to the other side, it adds force to the attractive beams of the earth and makes the body half heavy again.

‘After it was known that Irdonozur, the great monarch, had done me this honour, it is strange how much all respected me more than before. My guardians who had been hitherto cautious in relating anything of the government of their world, became now more open, so that from them, and Pylonas, I understood many notable particulars.

‘For a thousand years there was no thief or whore-monger on the Moon, for first there is no want of anything necessary for the use of man. Food grows everywhere without labour. As for clothes, houses or whatever else a man may be supposed to want, this is provided by the rulers, though not without some labour. But this labour is so easy as if they did it for pleasure.

‘All females are beauteous, and by a secret disposition of nature,

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a man there having once known a woman never desires any other.

'Murder was never heard of among the Lunars, neither is it possible to be killed, for there can be no wound made that is not curable. They assured me, and for my part I believe it, that if a man's head is cut off, within a mohth it can be joined to the carcass again. The juice of a certain herb applied, it will be so consolidated that the wounded part is perfectly cured.

'But the chief cause of their good government is the excellent disposition in the nature of the people; young and old hate vice and live in such love, peace and amity that it seems to be another paradisc. Though it is true that some are of a better disposition than others. This is discerned immediately at their birth. Because it is an inviolable law amongst them that none shall be put to death, therefore if it is perccived by stature or some other signs that newborn children may be of a wicked or debauched humour, they send them—I know not by what means—to earth and change them for other children. But first, they say, they keep them there for some time, till the air of the earth alters their colour to be like ours. Their ordinary point of departure for these children is a certain hill in the North of America, whose people, I am apt to believe, are wholly descended from the Lunars—descended both in regard of their colour and the continuous use of tobacco. The Lunars smoke exceedingly and the place abounds much with moisture.

'If you inquire how justice is executed—alas, what need is there of exemplary punishment where no offences are committed? Neither need they lawyers, for there is no contention. As little want is there for physicians. The air is always pure and temperate, neither is there any cause of sickness. I could never hear of anyone who was distempered. They die without pain, or rather cease to live,' as the candle ceases to give light when what nourishes it is consumed.

'I was once present at the departure of one of them and was

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much surprised that notwithstanding the happy life he lived, and the multitude of friends and children, he should forsake life. Yet as soon as he understood his end to approach, he prepared a great feast and inviting all whom he loved, exhorted them to be merry and rejoice with him.

‘Being dead the Lunars’ Bodies putrify not, and so are not buried but kept in certain rooms appointed to this purpose, so that most of the Lunars can show their ancestors’ bodies uncorrupt for many years.

‘It was the ninth of September 1599 that I began to ascend from the Pike of Teneriffe. Twelve days I was on my voyage, and I arrived in that province of the Moon, called Simiri, on September 21st. On May 12th I came to the court of Irدونозур and returned back on the 17th to the palace of Pylonas, where I stayed till March 1601.

‘When I earnestly requested Pylonas, as I had often done before, to give me leave to depart back to earth again, even with hazard to my life, he dissuaded me, insisting on the danger of the voyage, the misery of the place whence I came and the abundant happiness I now enjoyed. But the remembrance of my wife and children outweighed all these reasons. And to say the truth, I was so elated with the glory I should receive at my return to earth that I would hazard twenty lives rather than lose the chance of fame. I told Pylonas that I had so strong a desire to see my children that I could not possibly live any longer without them.

‘He requested me to stay one year longer, but I told him I must depart now or never, as my Gansas began to droop for want of their usual voyages. Three were already dead, and if a few more failed, I would be deprived of all possibility to return. At length I prevailed, having first acquainted the great Irدونозур with my intentions.

‘Perceiving by the often baying of my birds a great longing in

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them to be gone, I trimmed up my engine and took leave from Pylonas on March 29th. Three days after my waking from the last moon light, I fastened myself to the engine, not forgetting to take the jewels Irdonozur had given me, and a small quantity of victuals.

'A vast multitude of people being present, among them Pylonas himself, I let loose the reins of the Gansas who, with much greediness taking wings, quickly carried me out of sight.

'For the first eight days my birds flew before me, and I on the engine was as it were drawn. But on the ninth day, I perceived myself and the engine to sink towards the earth and go before the Gansas. I was then horribly afraid least my birds unable to bear our weight should precipitate headlong to the earth. I decided to make use of my stone "ebelus", which I clapt to my bare skin within my clothes. Instantly my birds made way with greater ease than before, seeming to be freed from a great burden.

'This voyage was performed in less than nine days, neither heard I any news from these airy men I met with when ascending, nothing stayed me in my journey, whether because of the great desire of my birds to return to earth or because the attraction of the earth was so much stronger than that of the moon, though I had three birds less.

'It happened to me as on my first passage—I never felt either hunger or thirst till I fell upon a high mountain in China—about five leagues from the city of Pekin.'

After his landing in China, Gonsales buried his Lunar jewels in a mole hill, never to find them again, and then "quietly surrendered to a Mandarin's troops". At first a prisoner and accused of being a sorcerer, he later gained favour with the mandarins and succeeded in making his plight known to missionaries of the Society of Jesus, who arranged for his return to Spain.



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At about the same time that Bishop Godwin's Moon travelogue appeared in print, another distinguished English ecclesiastic, Dr. John Wilkins, Bishop of Chester, subsequently a brother-in-law of Oliver Cromwell, published his *Discovery of a New World*. This contained "Two Discourses", one "Tending to prove that it is Probable there may be another Habitable World in the Moon" and another "Concerning the Probability of a Passage thither".

Strictly speaking, Wilkins's book was not an imaginary voyage to the Moon and certainly it was not a romance of the kind that his brother-in-Christ, Bishop Godwin, produced when he dispatched Domingo Gonsales on his lunar adventure. Rather, it took the form of a speculative essay with imaginative embellishments.

Wilkins was an erudite man, a great scholar and teacher. He had been Warden of Wadham College at Oxford when Cromwell made him one of the five commissioners who carried out the functions of the University's Chancellor. Later he became Master of Trinity College at Cambridge. He wrote many scientific works one of which, misleadingly entitled *Mathematical Magick*, dealt searchingly with problems of astronomy and mathematics. The Restoration deprived him of his academic offices but, despite his marriage to Robina, widow of Canon French and Cromwell's favourite sister, he still had many friends among the royalists and Charles II treated him leniently. Although he had to leave Cambridge, he was made Prebendary of York and later of St. Paul's Cathedral; he became the first secretary of the newly founded Royal Society and, in 1668, he was made Bishop of Chester.

Considering that he wrote *Discovery of a New World* before Newton laid the foundations of modern physics Wilkins tackled some aspects of the subject in a strikingly advanced, indeed prophetic, manner.

He advanced three possible ways of getting to the Moon. The

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first was the simplest: "It is not perhaps impossible that a man may be able to fly by the application of wings to his own body; as angels are pictured, as Mercury and Daedalus are feigned . . ." The second method the bishop unashamedly borrowed from Godwin: "If there be such a great Ruck in Madagascar as Marco Polo, the Venetian, mentions, the feathers in whose wings are twelve feet long, which can scoop up a horse and his rider, or an elephant, as our kites do a mouse—why then, it is but teaching one of these birds to carry a man, and he can ride thither as Ganimed did upon an eagle."

But in Wilkins's third suggestion we have the vision of great airliners spanning the world and venturing into outer space: "I do seriously and on good grounds affirm that it is possible to make a Flying Chariot in which men may sit and give such motion to it, as shall convey them through the air. It is not the bigness of any thing in this kind that can hinder its motion, if the motive faculty be properly provided. A great ship can swim as well as a small cork and an eagle flies as well as a small gnat. The engine may be contrived from the same principle by which Architas made a wooden dove and Regiomontanus a wooden eagle."

To reach the Moon Wilkins knew that his flying machine would have to overcome the earth's gravity. He assumed that an "Orb of Magnetic Vigor" around the earth may vary in degree proportionally to the distance from this world. It might even extend beyond the clouds. "We will suppose it to be about 20,000 miles high", he declared, "and if a man could get 20,000 miles upwards, it were possible for him to reach the Moon ultimately."

Wilkins strongly believed in the probability of an inhabited Moon and he asked the Government seriously to consider conquering the planet for the English nation.

When Wilkins wrote his *Discovery*, Charles I was still on the throne and, although the Bishop was later to become a staunch supporter of the Commonwealth, at this stage he was keen to

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enhance the glory of the Crown by adding the Moon to its dominions.

His enthusiasm was in accord with the mood of the nation. The first edition of the *Discovery* was published, in 1638, two years before the Long Parliament assembled. Despite the upsurge of radicalism at home, the dispute between the Stuarts and Parliament and the religious feuds with Scotland, England was beginning to reassert herself as a colonial power. A few years earlier, the Pilgrims had landed at Cape Cod; the London and Plymouth Companies had been firmly entrenched in the Virginias for more than thirty years. The Earl of Warwick had been granted rights in Connecticut, while Lord Baltimore had bought Newfoundland and secured a charter for a colony. Two thousand Englishmen and Scotsmen had settled in Bermuda and turned it into an important producer of tobacco; Sir William Coutten had established the first colony on Barbados; other islands in the West Indies—Antigua, Montserrat, St. Christopher—had been occupied and settled by the English. The Africa Company had established itself on the West African coast. The East India Company was spreading its business interests to Persia and Burma.

To Wilkins the proportion of the world open to expansion seemed to be diminishing rapidly and he dreamed of new pastures for colonial enterprise, free from the competition of avaricious Spaniards, Frenchmen and Dutchmen.

In his desire to persuade the authorities that the project was essential, Wilkins tried hard to prove that the Moon was a desirable property. Its mountains were not only "beautiful and convenient" but also served "many excellent uses", having been placed there to "tame the violence of great rivers . . . to break the force of the seas' inundation, and for the safety of the inhabitants, whether beasts or men". He concluded that "since Providence has some special end in all its works, certainly these mountains were not provided in vain; and what more probable meaning

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can we conceive there should be, than to make that place convenient for habitation?"

He did not attempt to minimize the difficulties which the colonizers would encounter, but he was convinced the Moon had an atmosphere which they would be able to breathe. He was not unduly worried about how the colonists would survive the journey and sustain themselves on the Moon. He displayed great faith in the benefits of frugality: "Since our bodies will be devoid of gravity and other impediments of motion, we shall not spend our strength in any labour, and so consequently not much need the reparation of diet. We may perhaps live altogether without food, as those creatures who by reason of their sleeping for many days have not spent any spirits and so not wanted any food, which is commonly related of serpents, crocodiles, bears, cuckoos, swallows, and suchlike."

Wilkins even supplied a few human examples: Epimedes, who slept for seventy-five years, and "a rustick in Germany, who being covered accidentally with a hayrick, slept there for all autumn and the winter following without any nourishment". Recalling Lucian and Plutarch he asked "if we must needs feed upon something, why may not smells nourish us?" Had not Pliny in his Natural History written of "a nation in India that lived only upon pleasing odors:" And Democritus had been able to feed himself for many days with the smell of hot bread.

As for human ability to survive on this strict diet, Wilkins quoted many examples. "Rondoletius tells us of a priest who lived forty years upon mere air, as also of a maid in France and another in Germany, who for years did feed on nothing but this . . ."

His enthusiasm growing with each example, and he quoted several more, Wilkins finally suggested: "The pure aethereal air may of itself be more natural to our tempers than any food we are taking on earth." However, if none of these conjectures were

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satisfactory, there was always a chance of loading sufficient victuals aboard the airship.

The possibility that British moon colonists might wish to sleep on such a journey received brisk treatment from the Bishop, despite the fact that he had previously recommended hibernation as a cure for hunger: "Seeing that we do not spend ourselves in any labour we shall not need the refreshment of sleep." Even if they did succumb they could "not desire a softer bed than the air where we may repose ourselves firmly and safely as in our chambers".

Having dealt in such masterly fashion with the rigours of the voyage, Wilkins's deliberations on the objective of the assault were almost cursory. He refrained from deciding whether "the Moon be more inconvenient for habitation than our world, whether its inhabitants are the seed of Adam, whether they are there in a blessed estate, or of some uncertain shape and nature".

Nevertheless, for the guidance of fellow investigators, he noted that the inhabitants of the Moon might not be men "but some other kind of creatures which bear some proportion and likeness to our natures, or it may be they are of quite different nature from anything here below, such as no imagination can describe". As Plutarch had suggested they might be "souls and spirits, some living on the planet, an inferior kind of Heaven, others damned spirits in the middle region of the air".

Wilkins himself was inclined to agree that Paradise might be situated on the Moon: "As there cannot be any place on earth designed where this should be, therefore 'tis not altogether improbable that it is in this other world".

Paradise or no, inhabited by souls, men or "uncertain creatures", Wilkins was certain some means would be invented "for our better acquaintance with these inhabitants". Moreover he emphasized the importance of the first overtures being made by Englishmen.

"We have not now any Drake or Columbus to undertake this

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"voyage", he admitted "or any Daedalus to invent a conveyance through the air." Yet he remained confident that England would not neglect the great opportunity of adding the Moon to her dominions.

In his *Discourse*, which he submitted to the Royal Society, he referred not only to the "great benefit and pleasure to be had by such a journey, and the acquaintance of the persons, language, art, policy and religion of those inhabitants", but also to the advantages "of the new traffick that might be brought thence". Reminding the authorities of "the pleasure and profit of those later discoveries in America", he urged them to remember that any commerce we might embark upon with the Moon would be inconceivably greater.

The plan to colonize the Moon for the benefit of England was seized upon by satirists. In *The Elephant in the Moon* Samuel Butler poked the gaitered leg of the Bishop and poked fun at the learned members of the newly established Royal Society who had given much thought to Wilkins's *Discovery of a New World in the Moon*.

Butler described a meeting of the Royal Society in these scathing words:

A Learn'd Society of late,
The glory of a foreign State,
Agreed upon a Summer's Night,
To search the Moon by her own Light;

To take an Invent'ry of all
Her real Estate, and personall;
And make an accurate Survey
Of all her Lands, and how they lay

And make the properm'st Observations,
For settling of new Plantations,
If the Society should incline
T' attempt so glorious a Design.

. . . And all stood ready to fall on
Impatient who should have the Honour
To plant the Eusign first upon her.

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This was only a droplet from a torrent of wit and jeers at the expense of the Bishop. Although it has undoubtedly taken longer in arriving than either Wilkins or the Royal Society anticipated the last laugh will be loud enough to redress the balance.

CHAPTER SIX

Moon Travel Becomes Fashionable

THE two English bishops, emboldened by the discoveries of the great astronomers of the late sixteenth century, had promoted the whole idea of flight into outer space from the mythological legends of Lucian and the mystical dreams of Plutarch several steps up the ladder towards the more mundane levels of cosmic speculation and impure science.

As J. H. Hodgson, the historian of acronautics, pointed out, the transition from the idea of flight embodied in mythology as a supernatural attribute of gods, to the spectral flittings of sorcerers and magicians preserved in legend and folk-lore, and thence to imaginary but factually described cosmic voyages of discovery, was inevitably a matter of centuries.

During this process more and more genuine astronomy and physics were gradually incorporated until the gap between the fairy-tale and the science-fiction story was bridged by Kepler, a great scientist who nevertheless still dabbled in magic and astrology.

Bishop Godwin's romance of Domingo Gonsales and Bishop Wilkin's serious "propositions", which were so near to science fiction, sowed the seed which grew into a rich plantation providing a harvest for innumerable writers of imaginary journeys into the cosmos.

Most of these writers were hacks, some were gifted imitators, but the list also includes great satirists, such as Samuel Butler,

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Johnson, Pope, Defoe and Swift, brilliant romancers like Cyrano de Bergerac and Gabriel de Foigny, and even great philosophers, such as Voltaire and Fontenelle. We can find even in Jules Verne and H. G. Wells distinct traces of the imagination sparked off by our two bishops.

It is natural that in our time we should be fascinated by those forecasts and suggestions of flights to the Moon which concern themselves with the technique of reaching their goal. We care little for those which dismiss such problems with a wave of a magician's wand. But any account of this subject would be incomplete without a glance at those Moon travellers who relied upon supernatural transport.

A century before Godwin had dispatched Domingo and his tame fowls to the Moon, and Wilkins had dreamed of an airship to help establish "commerce" with the lunar inhabitants, Lodovico Ariosto published his *Orlando Furioso*, the heroic epic about the dawn of the age of chivalry. In the final version of the six canti written in Ferrara in 1532, Ariosto sent his brave English knight Astolpho to the Moon to retrieve the mind of Orlando, who had lost it because of his illicit love for a Spanish maiden. Astolpho reached Paradise but searched in vain for the mind of the hero of Roncevalles. He had gone there because Saint John had told him he would find it on the Moon where "all things lost are stored".

'Tis true to journey further ye will need,
And wholly must you leave this nether sphere;
To the Moon's circle you I have to lead,
Of all the planets to our world most near.
Because the medicine, that is fit to speed
Insane Orlando's cure is treasured here.
This night will we away, when over head
Her downward rays the silver Moon shall shed.

So off they went, in a chariot drawn by "four goodly coursers, redder far than flame", which the prophet Elias used before for his ascent to Heaven, with St. John at the reins:

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The chariot, towering, threads the fiery sphere
And rises thence into the lunar reigns.
This, in its larger part they find as clear
As polished steel, when undefiled by stain;
And such it seems, or little less, when near,
As what the limits of our earth contain:
Such as our earth, the last of globes below,
Including seas, which round about it flow.

Ariosto's Moon was a beatific place, everything was far more beautiful and bigger than on earth:

Here other river, lake and rich champaign
Are seen, then those which are below descried;
Here other valley, other hill and plain,
With towns and cities of their own supplied;
Which mansions of such mighty size contain,
Such never he before or after spied.
Here spacious holt and lonely forest lay,
Where nymphs for ever chased the panting prey.

Another poetic account of a supernatural journey to the Moon came from the Spanish poet of the late Renaissance, Luis Sapata. He told of the terrifying expedition of Eugenio Torralva, a magistrate from Ciudad Real, who had made a pact with Satan and was carried through the air by devils. One of them, Zaquel, conducted him to the Moon.

The woes of Torralva were not entirely apocryphal. He was accused of black magic by the Holy Inquisition, and in 1528 made a written confession admitting he had undertaken nocturnal voyages through the universe with his "familiar" and that on one occasion he had flown to the Moon. Torralva's confession is preserved in manuscript in the National Library in Madrid.

Cervantes drew on this incident in *Don Quixote* when his Knight of the Sad Countenance embarked on a journey through the air to the kingdom of Candaya, mounted on the mechanical horse Clavileno. As Don Quixote and Sancho passed through "the second region of the air where the hail and snow are born".

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and were approaching "the third region, where thunder, lightning and thunderbolts are engendered", Sancho wished to take off the bandages which blindfolded them because they feared being burnt when they drew near the planets. But Don Quixote warned him: "Do not do such a thing. Remember the true story of Doctor Torralva, whom the devils took flying through the air, riding on a broomstick, with his eyes shut . . . As he was going through the air, the Devil bade him open his eyes, which he did and found himself so near the body of the Moon that he could have taken hold of it with his hands, and he dared not look down to the earth for fear of turning giddy."

Torralva's exploit was typical of the supernatural school of Moon literature, in which travellers were either in communion with good or evil spirits, drugged by soothing draughts, or all three.

John Donne, who has been called the first and most important of English metaphysical poets, was very interested in the astronomical discoveries of the seventeenth century, although he did at times treat them in a satirical vein. His *Conclave of Ignatius*, written after he had abandoned Roman Catholicism to join the Church of England, employed the theme of a cosmic voyage to attack the Jesuits. Putting himself "in an extasie", he made his "little wand'ring soul" visit the planets and "survey and reckon the rooms and all the volume of the heavens to comprehend the situation, the dimensions, the nature, the people, and the policy" of the Moon, the planets and "all those which are fixed in the firmament".

Having investigated the universe in this way, Donne suggested that all the Jesuits should be transferred to the Moon where they might establish a new Hell. He put the argument in this way to Saint Ignatius: "With the same ease as you pass from the earth to the Moon, you may pass from the Moon to the other stars, which are also thought to be worlds, and so may beget and propagate many Hells, and enlarge your Empire."

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But in the elegy on *The Progress of the Soul* about the daughter of a close friend, Elizabeth Drury, who died at the age of fifteen, Donne had this to say about the complex arrangements of the heavens, beloved by some writers:

And think this slow-pac'd soule, which late did cleave
To a body, and went but by the bodies leave,
Twenty, perchance, or thirty mile a day,
Dispatches in a minute all the way
Twixt heaven, and earth; she stayes not in the ayre,
To look what Meteors there themselves prepare
She carries no desire to know, nor sense,
Whether th'ayres middle region be intense;
For th 'Elements of fire, she doth not know,
Whether she past by such a place or no;
She baits not at the Moone, nor cares to tric.
Whether in that New World men live and dic.

Milton's *Paradise Lost* has many allusions to the Other World. Indeed the Third Hell bears a marked resemblance to the "Privolva" described by Kepler:

Beyond this flood a frozen continent
Lies dark and wild, beat with perpetual storms
Of whirlwind and dire hail, which on firm land
Thaws not, but gathers heap, and ruin seams
Of ancient pile; all else deep snow and ice . . .

Thither by harpy-footed furies haled,
At certain revolutions all the damned
Are brought; and feel by turns and bitter change
Of fierce extremes, extremes by change more fierce,
From beds of raging fire to starve in ice
Their soft ethereal warmth, and there to pine
Immovable, infix'd, and frozen round,
Periods of time, thence hurried back to fire . . .

There is another cosmic voyage in the second book of *Paradise Lost* when Satan himself embarked on a journey through chaos. This was written, or at any rate published, some thirty years after the books by Godwin and Wilkins had appeared. Milton was

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fully acquainted with thought on the subject of aeronautics and in his *History of Britain*, published in 1670, he described the attempted flight of Oliver of Malmesbury, in 1020, who "had made and fitted wings to his hands and feet; with these on the top of a tower spread out to gather air and flew more than a furlong". But he felt supernatural methods were more suitable for *Paradise Lost*.

The tradition of the supernatural voyage in literature died hard, persisting into the second half of the eighteenth century. Voltaire's "*Micromegas*", the inhabitant of Sirius, travelled "from moon to moon" with the aid of a sunbeam, despite the fact that he was "a wonderful adept in the laws of gravitation, together with the whole force of attraction and repulsion".

The metaphysical approach lasted even longer on the Continent than in England. One notable example was *Voyage du Monde de Descartes* by Gabriel Daniel. This French writer was a Jesuit and a sober historian who died in 1728, at the age of seventy-eight, in Paris. During his long life he produced a twenty-four volume *History of France* and several books on military history. His excursion to the Moon was prompted, he explained, by "so many different accounts given of lately discovered lands, but scarce mention made of the Other World, though an infinite number of French, English and Dutchmen are determined to go to it". But the real reason was obviously his desire to settle accounts with Descartes, the great philosopher who a century earlier had pronounced the principle *cogito, ergo sum* (I think, therefore I am) which had brought him into conflict with the Roman Church.

Descartes said that the world and all living things consisted of "mind" and "matter" which were strictly separate and not dependent on one another. All physical things could be determined by mathematical and geometrical measurements.

The Cartesian philosophy provided Daniel with a lever for a scathing satire. Descartes arrived at his perception by an "Act of Will". Daniel, in his book, sent a Cartesian disciple—a caricature

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ture of the great philosopher—to the Moon by drugging him with a dose of potent snuff. He sneezed so violently that his mind was separated from his mortal body: "In an instant my soul perceived the unspeakable pleasure to scud high into the air." On his way to the Moon the Cartesian disciple met many deceased philosophers, now floating souls, with whom he had some heated arguments. On the Moon he found Monsieur Descartes "still busily engaged in correcting the mistakes of the Almighty".

Daniel's description of the lunar world was not very original: "The Moon is a mass of matter much like that of which the earth is composed. There are fields and forests, seas and rivers . . ." but neither beasts nor men. Acidly Daniel remarked that if Cyrano found men on the Moon, he was deceived by souls who had taken a human shape, or more likely he had deceived himself because the "many profane allusions and libertine reflections he made were the fruits of a debauched imagination and a corrupt mind". Uninspired though his descriptions of the Moon were, it is obvious Daniel must have studied the lunar atlas and planetary descriptions published some years before by Bernard le Bouvier de Fontenelle, whose *Plurality of the Worlds* took the form of a discussion with a titled lady about astronomy. Daniel's Moon travellers visited "the estates of several famous astronomers, who now dwell on the Moon as souls" and after whom the lunar mountains and seas were named.

'We crossed the great ocean, leaving on the left the island of Winds, and on the right the Island of Copernicus . . . and, proceeding towards the middle of a vast landmass, stretched from east to west, much like the continent of America, we discovered upon the Sea of Rains a large town, which we were curious to visit. But we found all approaches and avenues guarded by souls, who refused us entry, though they were civil and obliging.'

It transpired that the town was that of Plato, and that the Greek philosopher had established his "Republic" there. Farther on, in the Sea of Cold, Daniel's traveller visited the Island of

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Aristotle, inspecting the "Lyceum of the Moon", an academy of science. Also discovered were ancient ruined towns—Atlas, Cepheus and Hermes, but they were all deserted. While there were charming passages in his book, Daniel's attempts at deriding Descartes's sublime philosophy and his insistence on providing a lengthy catalogue of lunar topography, so obviously gleaned from Fontenelle and Hevelius' "*Selenographia*", made much of it tedious reading.

★ ★ ★

On this side of the English Channel the work of Godwin was proving useful not only to satirists but also to those responsible for entertaining the public. It was treated in ballads and ditties, opera and comedy, even reaching the highest pinnacle of popular art by becoming the subject of a pantomime.

In 1706 Thomas d'Ufrey adapted Godwin's *Man in the Moon* for a comic opera, which boasted elaborate scenery showing the luminous lunar world and Domingo's machine hanging from the ceiling. The piece was well received by London society and D'Ufrey followed up his success with adaptations of Cyrano's voyages entitled *Wonders of the Sun* and *The Kingdom of Birds*. A "Great Spectacle" presented by Elkanah Settle, entitled *The World in the Moon* could have competed with a Cochran revue.

A contemporary critic described the scene thus: "Three grand arches of clouds extended to the roof of the house, while circulating clouds rolled softly away to disclose a silver moon nearly fourteen feet in diameter." Inhabitants of the Moon danced upon the stage. They included "green men", changelings who had been sent to earth and, perhaps understandably, longed to go home. One of their earth-bound lyrics ran:

All my Disciples must be airy,
And dance as nimbly as a Fairy,
Must never think of sordid Dying,
But practice must the Art of Flying.

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Mrs. Aphra Behn contributed a play *The Emperor of the Moon*, based on Godwin's tale, to meet the fashionable demand.

In this drama the Moon King, Irdonozur, fell in love with a fair maiden from the earth, faced disaster, and was generally subjected to considerable anxiety only to be informed in the third act, by the lunar magicians, that the maiden was in fact his own daughter. The play was performed in 1687 before their Majesties at London's Queens Theatre, while another version, in which Biancolilli, the famous harlequin, played the Emperor, made full houses in Paris.

Meanwhile the satirists were having a fine time. When the enthusiasm for the telescope was superceded by growing interest in the newly invented microscope, Samuel Wesley wrote a poem in which Domingo's well-trained Gansas gave place to tame fleas and lice who drew a chariot "beyond the attraction of dull earth and on to the Moon", lustily hopping from planet to planet.

In 1677 Thomas Shadwell produced a comedy, *The Virtuoso*, at the Duke's Theatre, London, in which he poked fun at the Royal Society. The main character was "Sir Nicholas Gimcrack, the great scientist", who wanted to fly through the universe. "I doubt not but in a little time the art of flying will so improve, it will be as common to buy a pair of wings to fly to the Moon, as to buy a pair of wax-boots to ride into Sussex with . . ." This line from Sir Nicholas was adjudged highly amusing by the audience. The Duchess of Newcastle, irreverently christened "Mad Madge of Newcastle" by Charles Lamb produced the very first lady-traveller to the Moon, in the heroine of the *Blazing World*. This opus the duchess described thus: "The first part is Romantical, the second Philosophical, and the third Fantastical." Her heroine, the first woman aeronaut, flew to many planets, discovered lunar men, bear-men, bird-men and fly-men. Eventually she married the Emperor of "The Blazing World". For all that, it was a most involved and extremely boring romance.

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Another writer to climb on the bandwagon to the Moon was one who hid under the pseudonym of "Lucas Lunanimus of Lunenberg". He told his readers that the discovery of the world in the Moon was made by "Cornelius Drebble of Alcman in Holland". But there is little doubt that an Englishman perpetrated the work which was entitled *The Lunarians: Or News from the World of the Moon*. It was addressed to the "Lunaticks of this World". Some contemporaries ascribed it to Samuel Butler, but this was grossly unjust. The only possible reason for connecting Butler with the piece was that the hero went to the Moon on a kite "of the height of a large sheet, fixing himself to the tail of it". The hero took off "bestriding the tail of his Pegasus as millers mount their asses". This was similar to an idea of Samuel Butler's in *Hudibras*:

It happened as a boy, one night,
Did fly his tarsel of a kite,
The strangest long-wing'd hawk that flies,
That, like a bird of Paradise,
Or herald's martlet, has no legs,
Nor hatches young ones, nor lays eggs.

Francis Gentleman, known principally for his editing of Shakespeare, drew his hero "Sir Humphrey Lunatic, Bart." from the earth to the Moon by "rays of attraction". Thereafter Gentleman managed to write no less than two large volumes on this "Trip to the Moon". But like so many of the eighteenth-century Moon voyages his account was filled with political and social satire of Britain.

In the same vein was William Thomson's *The Man in the Moon: Or Travels into the Lunar Regions*, a heavy political work in which Charles Fox was carried off to the Moon to continue his feuds against William Pitt. However, among this mass of material there were books and pamphlets mentioning imaginative means of travel.

Murtagh McDermot, in his *Trip to the Moon*, published in

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Dublin in 1728, used a projectile which was very similar to the one invented by Jules Verne 150 years later: "We already know how gunpowder will raise a ball of any weight to any height. Now I design to place myself in the middle of ten wooden vessels, placed one within another, with the outermost strongly hooped with iron, to prevent its breaking. This I will place over seven thousand barrels of powder, which I know will raise me to the top of the atmosphere." As a safety precaution he also provided himself with wings, fastened to his arms, in case anything went wrong with his vehicle and he had to escape during the journey. Lunar men helped him to return to the earth by digging a firing hole a mile deep on the Moon.

Another curious missile was devised by David Russen, whose *A Voyage to the Moon*, published in London in 1703, bore the subtitle "Considerations on the Nature of that Planet and the Possibility of Getting Thither". Much of it was derived from Bishop Wilkins's work, but his transportation consisted of a kind of funicular from the earth to the Moon, powered by a giant spring. The machine was set up on a high mountain and "since springiness is the cause of forcible motion, and a spring will, when bended and let loose, extend itself to its length: could a spring of well-tempered steel be framed, whose basis being fastened to the earth and on the other end placed a frame or seat, wherein a man, with other necessaries, could abide with safety, this spring being with cords, pullics or other engines, bent and then let loose by degrees by those who manage the pullies, the other end would reach the Moon".

It was as simple as that, and the resourceful Mr. Russen, who live at Hythe, in Kent, was equally confident about the return journey: "The person ascended, landing on the Moon might continue there, and according to a time appointed, might again enter into his seat, and with pullics the engine may again be bent, till the end touching the earth should discharge the passenger again in safety."

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The balloon was not invented until 1783 when Joseph and Etienne Montgolfier sent up a large paper bag, filled with hot air, to a height of 6,000 feet. Twenty years earlier Henry Cavendish discovered that the specific gravity of hydrogen or, as he called it, "inflammable air" was less than that of the atmosphere. It was then only a question of obtaining sufficient hydrogen to fill an efficient envelope. These events were foreshadowed by Father Joseph Gallien of Avignon in his proposal, in 1755, for a flying Noah's Arc inflated with air. However this idea was based on a false assumption that air pumped in on the earth's surface would prove lighter than the surrounding atmosphere at great heights.

When, at last, the feasibility of ballooning was established, writers of imaginary space voyages seized upon this method. Probably the first to use it was the anonymous author of *A Voyage to the Moon*, who used the pen-name of Nicholas Lunatic, styling himself ironically a "Fellow of the Royal Society". He described his take-off to the Moon thus :

'In order to prosecute my plan as secretly as possible, I took a woodcutter's cabin in a forest in Warwickshire, laid in a small stock of provision and, unseen by mortal eyes, began my operations. I first made an immense bag of silk, of spherical form, more than twice the size of any balloon I had ever seen. This I strengthened by a coat of varnish, and covered it with a strong network, then filled the silk with inflammable air. When I had done that, my fears were greatly excited by the astonishing propensity it had to ascend. So great were its exertions that it loosened two trees to which I fastened it, and had I not at that very moment succeeded in attaching it to double the number, my vehicle would most certainly have departed without me.'

But all went well. Nicholas jumped into the car, cut the ropes and ascended "swifter than the ball from the cannon's mouth".

MOON TRAVEL BECOMES FASHIONABLE

The journey was uneventful. On approaching the Moon he saw that it was an immense continent, abounding with high mountains, large valleys, deep cavities, and even volcanoes. From then on Nicholas began to regret his venture. On the Moon he met inhabitants "whose consummate folly is the least of their defects, for they are entirely destitute of those virtues which adorn my dear countrymen". Unlike other English Moon travellers, who had nothing kind to say about the Mother Country, Nicholas was deeply homesick. Marooned on the Moon, without means of return he lamented: "Good Heavens, what could induce me to be so desirous of empty fame as to leave such an enlightened nation to herd with lunar madmen!" He did not explain how his literary testament reached London to be published in 1808.

There was one serious proposal that a flying boat based on the lighter-than-air principle might reach the planets. It was made at least a century before the invention of the balloon. Francesco de Lana-Terzi, a Jesuit priest, even went so far as to construct a boat-shaped car, resting on four large globes of very thin copper, from which the air had been completely extracted. This he did in 1670, having calculated that his flying boat, weighing less than the surrounding air, would rise rapidly. In its early stages the project was defended by Philipp Lohmeier, a professor of physics in Hesse. However, the thinness of the globes alone could never have withstood the pressure at altitudes of even a few thousand feet and Lohmeier's calculations were obviously not based on scientific fact.

A German, Eberhard Christian Kindermann, must have read Professor Lohmeier's account of Lana's flying boat. He adopted the invention for his book *Swift Journey by Airship to the Upper World*, published in Frankfort in 1745.

Five German mariners took off, having increased the boat's velocity by adding four more copper globes, as Lohmeier himself had advised in his *De Artificio Naviganda per Aerem*. The warning of the mathematician and philosopher Leibniz that such a flying

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boat would disintegrate was disregarded. All went well on Kindermann's enterprise, the object of which was to find out "whether it was true that on that day—July 10, 1744—the planet Mars appeared with a satellite for the first time since the world was in existence", as the German astronomer Leonhard Euler had forecast. With their friends in Germany watching their progress through powerful telescopes, the five men circumnavigated the Moon and floated on through the universe to other planets.

Lana's hovering boat was again used by his compatriot, Bernard Zamagna, in 1768; but only for flying around the world. A Brazilian, Bartholomeu Lourenco de Gusmao also adopted Lana's idea to build a more ingenious airship which combined "hovering by rarified air with the use of feathered wings and the attractive power of magnets". His ship *Passarola* never left the ground, but Gusmao did succeed in persuading King John V of Portugal to part with a small fortune to build it.

One of the most delightful accounts of a voyage to the Moon was in a picture book by the Florentine artist, Filippo Morghen. It depicted "the most notable things seen by the Cavaliere Wild Scull and Signor de la Hire on their famous voyage to the Land of the Moon". Morghen was the father of the more famous Raphael Morghen who produced the wonderful etched reproductions of the works of Leonardo da Vinci and Raphael, and created his own portraits of Dante, Petrarca and other great Italians. Filippo's "Raccolta" etchings showed travellers reaching the Moon on a flying arc. There they found an entrancing world where the Selenites dwelt in huge pumpkins hanging from trees and sailed through canals in gondolas.

The first "electric flying machine" to be used in a space voyage was that of Louis-Guillaume de la Follie, a French chemist. He described it in his book *Le Philosophe sans Prétention* published in Paris in 1775.

This did not deal with a lunar expedition, but described a visit of an inhabitant of Mercury to the earth.

MOON TRAVEL BECOMES FASHIONABLE

As technical inventiveness grew, the objectives of Moon travellers became increasingly more mundane until Bishop Wilkins's desire to bring the Moon under the English Crown seemed merely romantic, compared with the mercenary reasons for lunar exploration given by writers during the late eighteenth and early nineteenth centuries.

CHAPTER SEVEN

To the Moon by Jet—300 years ago

THE most extraordinary, and probably the most brilliant author ever to compose an imaginary cosmic journey was Cyrano de Bergerac. His *Voyage to the Moon* was published in 1657, two years after his death at the age of thirty-four. The manuscript had been rescued by his devoted friend Le Bret, who carefully expurgated what he thought were the most objectionable passages. This did not prevent the *Voyages to the Moon and the Sun* being attacked as impious and irreverent.

Yet even the most severe critics of the work paid tribute to its sparkling wit, whimsical philosophy and beautiful prose. Of course, if Cyrano were to be remembered solely for his writings, the world's memory of his existence would be dim indeed. As it is, all his other pieces, a tragedy in verse entitled *The Death of Agrippina*, a few poems, a light comedy in prose, literary letters and a set of rather weak jokes, have been almost entirely forgotten. Perhaps the most important contribution to literature by this possessor of mankind's most famous nose, sprang from the inspiration and material he had provided to other great writers. Molière did not scruple to steal from notes and fragments Cyrano trustingly gave him to read, Fontenelle owed something to the wit of Cyrano, when he wrote *Conversations of the Plurality of the World*, as did even Voltaire when he wrote *Micromegas*.

But to the last three generations Cyrano has been known, almost exclusively for the gusto of his extraordinary life, as the

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hero of Edmond Rostand's verse play. Of this play, which has filled theatres for decades, Richard Aldington, the most distinguished English biographer of Cyrano offered this warning: "Everything picturesque which fancy and rumour had attached to the name of Cyrano during the centuries was taken up by Rostand, exaggerated, idealized almost to infinity and the world believed this to be the real Cyrano."

What manner of man then, in real life, was the author of the *Voyage to the Moon*, one of the most important and original books on the subject?

One thing is certain. He was not the hero and delicate lover depicted by Le Bret and idealized by Rostand. Neither was he a noble Gascon, but the grandson of a fishmonger of humble Sardinian origin. The fishmonger made a fortune, obtained a minor sinecure at the French Court and bought a manor at Bergerac. His son Abel, Cyrano's father, received a good education and became an advocate to the Paris Assembly.

Cyrano was sent to a good school, run by Father Kostgaenger, where he was a bad scholar with a high intelligence. It was at school that he made the friendship with Le Bret which was to last throughout his brief and stormy life. After his death Le Bret edited all his works and produced an apocryphal biography which was to mislead posterity and help create a legend.

According to Le Bret, Cyrano was "a man of singular wit, to which he added such good fortune on the side of the senses that he always controlled them as willed". And, as Le Bret would have it, "he rarely drank wine, was no less moderate in his eating . . . believed that the simplest and least complicated living is the best . . . added to these good qualities great restraint towards the fair sex . . . and had so great an aversion from self-interest that he could never imagine what it was to possess private property".

However, the truth about Cyrano was undoubtedly reached by Richard Aldington when he wrote: 'Into the society of revellers, unscrupulous, heedless, coarse and irreligious, but brave, witty,

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chivalrous, talented, and merry, came a young man of eighteen, the owner of a curious nose, shaped like a parrot's beak, talented, witty, and brave himself, already a brilliant swordsman, scatter-brained, vain with all the vanity of young men in Latin countries, eager for knowledge, but filled with hatred for the theology and pedantry of his early masters, . . . Is it not almost hypocritical to expect that he would do anything different from what he apparently did do: drink, gamble, blaspheme, whore, talk atheism, play mad pranks, and slit men's throats in duels?

An attempt to rescue Cyrano from this life was made by the mild-mannered and pious Le Bret who persuaded him to take a commission in the Royal Guards. Although he did not stop gambling and drinking he did have to apply a modicum of self-discipline. He fought scores of duels and was involved, as a second, in a hundred more. Nevertheless he found time in the Army to read widely and also to distinguish himself in battle. He underwent the siege of Mouzon, by the Austrians, and was wounded badly in action several times. He retired from the Army, a hardened veteran, at the age of twenty-two.

Though not entirely relinquishing his rumbustious way of life he now devoted much time to serious studies. He met some of the great figures of France in the early years of Louis XIV's reign. Notable among them were Petrus Gassendi, the exponent of Epicurean philosophy who sternly opposed the beliefs of Aristotle and Descartes, and another philosopher, François Le Mothe de Vayer, a friend of Cardinal Richelieu and the tutor of the young king. Molière read Cyrano's light-hearted poems and later used them for his own purposes. The poet Chapelle, who wrote travel tales of Provence and Languedoc, probably influenced Cyrano more than any of his other acquaintances. After meeting him Cyrano began writing seriously and it is possible that Chapelle's stories of travellers in romantic France eventually guided his thoughts to the epic *Voyages to the Moon and the Sun*.

However, literature and the company of philosophers, poets,

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and dramatists failed utterly to absorb all the abundant energies of Cyrano de Bergerac.

During this period the famous "battle" of the Porte de Nesle took place. Out of this episode Rostand created a heroic encounter of valiant knights. In fact one of his friends, Chevalier de Lignières, a lusty, ribald character after Cyrano's own heart, was being pursued by a cuckolded husband, who had hired a group of rogues to attack the seducer and "crop his ears". Lignières enlisted the help of Cyrano and two comrades. They set off to do combat and rode straight into the ambush prepared for them not far from the Faubourg St. Germain.

According to some chroniclers there were a hundred assassins waiting for them. This is extremely doubtful but it is certain there was a dangerously large group of accomplished fighters who had the advantage of surprise. Cyrano took them on single-handed. His companions retreated. Two of the assassins were killed and seven wounded by the fearsome Cyrano. The remainder fled before this onslaught, and Marshal Gasson, hearing of the encounter, immediately offered de Bergerac a position.

Another famous "battle" in which Cyrano took part, that of the Bout du Pont-Neuf, was in reality little more than a street brawl. A showman called Brioche had a puppet spectacle near the famous bridge and among the attractions was a monkey. When Cyrano was passing the marquee some ruffians jeered at his extraordinary nose; one even dared to tweak it. Whereupon chaos commenced. Cyrano charged the mob and chased them around the showplace. The terrified ape jumped out of its cage and was mistaken by Cyrano for one of his critics. He promptly cut its throat with his sword. The showman sued for damages. Cyrano defended himself ably and offered to make amends by immortalizing the animal in one of his poems. This generous suggestion did not deter the judge from ordering him to pay fifty louisdors to the bereaved Brioche.

Another incident, caused by the unhappy combination of an

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enormous nose and a temper to match, took place inside a theatre. Cyrano quarrelled with the famous comedian Mondory, who made mockery of the nose. Mondory received a letter from Cyrano forbidding him to appear in the theatre for one month. Mondory disobeyed and Cyrano rushed into the auditorium with his naked sword, stopped the performance and threatened to kill the actor on the stage.

'Cyrano was mad and a great sword-clanker. His nose which was very ugly was the cause of his killing at least ten people . . .' wrote one of his contemporary critics.

Such was the man who, in his saner moments sat at the feet of the great philosophers of his time and gave the world an immortal story of a voyage to the Moon, a journey that began, fittingly, with a bet . . .

'The moon was full, the sky clear and it had just struck nine, as I was returning with four of my friends from Clamard, near Paris, where M. de Cuigny had entertained us.

'The sight of that globe of saffron provoked various thoughts in us, and our eyes were filled with this great luminary. One of us likened the Moon to a window in Heaven through which the glory of the blessed might be seen. Another, inspired by ancient fables, imagined that Bacchus kept a tavern in Heaven and had hung out the Full Moon for his sign . . .

"For my part," said I, "I think that the Moon is a world like this and that our world is their moon." The company gratified me with a great outburst of mirth.

"Perhaps in the same way," I said, "at this moment in the Moon they jest at someone who there maintains that the earth is a world. . . ."

I returned home and scarcely had I entered my room when I found on the table an open book which I had ~~not~~ put there. I recognized it as mine, and asked my servant why he had taken it out of the book-case. He swore to me that either the devil

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or I had put it there. For my part I was sure I had not handled it for more than a year.

'I glanced at it again. It was the works of Cardan* and I fell, as if directed to it, precisely upon a story in which he told how two tall men entered through the closed door of his room and told him they were inhabitants of the Moon.

'I remained so amazed to see a book brought there by itself as well as at the time and the leaf at which I found it open that I took this train of events to be an inspiration of God, urging me to make known to men that the Moon is a world.

"What!" I thought, "after I have talked of the Moon this very day, a book which is perhaps the only one in a world that treats of this subject, flies down from the shelf on to my table, becomes capable of reason to the extent of opening at the very page of so marvellous an adventure . . . Doubtless the two old men who appeared to Cardan are the same who have moved my book . . . But how can I clear up this doubt if I do not go there?"

'I shut myself up to achieve my purpose in a lonely country house where, after trying several methods, I dispatched myself skywards in this manner:

'I fastened about me a number of little bottles filled with dew, and the heat of the sun drawing them up carried me so high that at last I found myself above the loftiest clouds.

'But, since this attraction caused me to rise too rapidly, and instead of drawing me nearer the Moon, as I desired, seemed to divert me farther off than when I started, I broke several of the bottles until I felt that my weight overbore the attraction and that I began falling towards the earth.

'I reached the ground calculating from the hour at which I had started that it ought to have been midnight. Yet I perceived the sun at the highest point above the horizon. It was midday. My surprise was great . . . and my astonishment increased when I found I did not recognize the country I was in. It appeared to

* Geronimo Cardano (1501-76), Italian mathematician and astrologer.

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me that, having risen straight up, I ought to have landed in the place from which I started.

'I approached a hut where I perceived some smoke and I was barely a pistol-shot from it when I was surrounded by a large number of savages. They appeared mightily surprised at meeting me; for I was the first man, I think, they had ever seen dressed in bottles. And they saw that as I walked I scarcely touched the ground. They did not know that at the least movement of my body the heat of the midday sun lifted me up with my dew.

'I tried to converse with them. But as if terror had changed them into birds, they fled and were lost to sight in the woods. Nevertheless, I caught one and asked him with much difficulty—for I was out of breath—how far it was from there to Paris, since when people went about naked in France, and why the others fled from me in such terror.

'The man to whom I spoke was an old man, yellow as an olive. He fell at my knees, joined his hands above his head, opened his mouth and shut his eyes.'

The behaviour of the old man merely increased the mystery which was not solved until the arrival of some soldiers when Cyrano realized that he had landed "in France, but not in Europe, for it was in New France, in Canada". He was brought before the Viceroy, to whom he told the story of his air journey. The governor accepted his explanation that the earth must have turned during the flight, which had caused the journey, begun two miles from Paris, to end in Canada. The governor, who treated him kindly, warned Cyrano that the Jesuit Fathers were convinced that he was a magician or an impostor. After long conversations with the governor on the possibility of reaching the Moon, Cyrano decided to leave and carry out his intention by other means.

After he had constructed a machine, of which he gave only

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a vague description, he tried to take off from the summit of a small hill outside Quebec, but tumbled straight into a valley. Bruised from head to foot he returned to the lodgings which the governor had provided for him.

'After I had comforted my heart with a bottle of cordial, I took some beef-marrow and greased all my body with it for my bruises. Then I returned to the wood to look for my machine. Some soldiers had been sent into the forest to cut wood for a Saint John's fire to be lighted this evening. They had come upon my machine and had carried it to the fort.

'The machine consisted of a large spring, with rockets bound around it. The rockets would lift it high into the air and the spring would move its great wings. Everyone would take the machine for a fire dragon.*

'I sought the machine for a long time and at last found it in the middle of the market place of Quebec just as they were lighting it. The pain of seeing my work in such peril affected me so much that I rushed forward to grasp the arm of the soldier who was about to set fire to it. I seized his slow-match and cast myself furiously into the machine to break off the fireworks which surrounded it.

'But I came too late. I had scarcely set my two feet in it when I was carried off into the clouds. The flame had no sooner consumed one line of the rockets (for the soldiers had placed them in sixes by means of a fuse which ran along each half-dozen) when another set caught fire and then another, so that the blazing powder delayed my peril by increasing it.

'The rockets at length ceased through the exhaustion of material and, while I was thinking I shall lose my head on the summit of a mountain, I felt my elevation continue.

'Then, my machine, taking leave of me, fell towards the earth. I sought, with my eyes and my mind, for the reason of this

* Cyrano's mechanics are vague, but he had a vision of a jet propelled aircraft.

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miracle and I perceived that my flesh was still swollen and greasy with the marrow I had rubbed on it for the bruises caused by my previous fall. I remembered that at the time the Moon was waning and that during this quarter she is wont to suck up the marrow of animals.

'The Moon drank the marrow I had rubbed on myself with increasing eagerness, now that her globe was nearer me and that her strength was not weakened by intervening clouds.

'When I traversed more than three-quarters the distance between the earth and the Moon, I suddenly turned a somersault without having stumbled. Indeed, I should not have realized it, had I not felt my head burdened with the weight of my body. I realized then that I was not falling towards our world, for although I was between two moons and could see very well that I drew farther from the one as I approached the other, I was certain that the larger was our earth, since after a day or two of travelling the distant reflection of the sun confounded the diversity of bodies and climates and therefore it appeared to me like a large gold platter. From this I supposed that I was descending upon the Moon.

'After I had been long falling—and the violence of my fall prevented me from observing it—I remember no more than that I found myself under a tree, entangled with three or four rather large branches which I had snapped off in my fall, and feeling my face moistened with an apple which had been crushed against it.'

The subsequent pages of Cyrano's story satirized the book of Genesis and, because of the allegedly blasphemous contents, were always expurgated from the early editions. Cyrano, after his arrival, decided that the place he had reached was "the Earthly Paradise" and that the branches which had broken his fall belonged to "the Tree of Life".

'The fruit's powerful juice trickling into my mouth, revived my

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soul and my warm corpse was ready again to perform the functions of life. As soon as I was on the ground my pain departed and I lost the hunger that had so tormented me during the voyage.

'I got up and I had scarcely noticed the banks of the largest of the four great rivers, which there form a lake, when the scent or soul of the herbs which breathe out over that land delighted my nostrils. The little stones were neither hard nor rough, except to the sight. They were soft when I walked on them.'

'There, on all sides, the flowers exhale a wild breath which awakens and satisfies the sense of smell; there, every season is spring; there, no poisonous plant grows; there, the rivulets relate their journeys to the pebbles; there, a thousand little feathered voices make the forest ring with the sound of their songs. . . . Beside this wood there are two meadows whose continuous green forms one giant emerald to the horizon. . . . In the midst of this vast perfect carpet flow the silver bubbles of a rustic fountain whose banks are crowned with turf enamelled with daisies, buttercups and violets.'

'I must admit that the sight of so many beautiful things made me feel as agreeable as the embryo is said to feel when the soul is infused in it. My old hair fell out and was replaced by thicker and finer tresses. I felt my youth relighted, my face grow rosy . . . my age diminished some fourteen years..

'I had walked half a league through a forest of jasmine and myrtles when I perceived something moving in the shade. It was a young man whose beauty compelled me to adore him.'

The young man introduced himself as the prophet Elijah. From the prophet, Cyrano learned that he had, indeed, reached the Moon. Moreover, he had landed in the Paradise and was only the sixth person ever to have entered that place, the other five being: Adam, Eve, Enoch, Elijah himself, and St. John the

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Evangelist. Elijah proceeded to tell him the strange story of the banishment of Adam and Eve.

'You know very well how the two first were banished hence, but you do not know how they came to your world. Know then that when they had both tasted the forbidden apple, Adam, fearful lest God should be further irritated by his presence and increase his punishment, considered the moon, your Earth, as the sole refuge wherein he could shelter from the vengeance of his Creator. Well, at that time man's imagination was so strong, being not yet corrupted by debaucheries, coarse foods or by the weakening of diseases, that when he was excited by a violent desire to reach this refuge, his whole body became lightened through the fire of this enthusiasm and he was uplifted, just as certain philosophers, whose imagination has been greatly moved by something, have been carried into the air by transports which you call ecstatic. Eve was weaker and, because of the infirmity of her sex doubtless would not have possessed an imagination able to conquer by the mere strength of its will the weight of matter, but since she had been but a little time made out of her husband's body, the sympathy which still bound this portion to the original whole, carried her after him . . . When they reached your Earth they took up their abode between Mesopotamia and Arabia; the Hebrews knew him by the name of Adam and the idolaters by the name of Prometheus . . . Thus the first man left this world, deserted to inhabit yours; but the All-Wise willed that so happy a dwelling-place should not remain uninhabited and a few centuries later he granted Enoch permission to leave the company of mankind, whose innocence had become corrupted.'

Thus Enoch had come to the Moon paradise, where during the Flood the waters rose so high that "the Ark swam in the Heavens beside the Moon". Jacob's ladder was not yet invented and

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Enoch filled two large vessels with the vapours of the divine flame God had sent him. He sealed the vessels and attached them under his armpits, rising to the Moon. (Cyrano's biographer, Juppont, considers this a premonition of the balloon.) Elijah then told him the story of his own journey to the Moon. Envyng Enoch, he yearned for the Paradise and one night an angel appeared to him and enlightened him how to get there. He dissolved a load-stone, drew from it "the attractive principle", brewed an elixir and produced a small ball which he took with him to a chariot. Casting the "attractive ball" high into the air, the chariot and its passenger were raised into the sky, and by throwing the ball repeatedly upwards, Elijah flew to the Moon. Arriving safely, he found the Tree of Knowledge and met Enoch and St. John the Evangelist.

When Cyrano expressed doubts about Elijah's journey the prophet was so angered he began dragging Cyrano to the gate, to throw him out of the paradise. On the way they came to the Tree of Knowledge, off which Cyrano quickly plucked an apple.

'I had scarcely tasted it when a thick night descended upon my soul. I did not see my apple any more nor Elijah beside me, and I was vastly surprised to find myself alone in the midst of a land I did not know. I turned my eyes about me and gazed over the country, but no living thing presented itself to console me. I decided to walk forward and at the end of a half-quarter of an hour I met with two large animals. One stayed before me while the other ran swiftly towards its den; at least I thought so, because a little time later I saw it return with more than seven or eight hundred of the same species, who surrounded me.'

'One of the beast-men seized me by the neck, as wolves do when they carry off a sheep, threw me upon his back and took me to their habitation.'

'I was greatly astounded when I saw they were indeed men, and yet every one I met walked on four legs. When the people

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saw me pass, seeing I was so small (for most of them were twelve cubits high), and that my body was supported by two feet only, they could not believe that I was a man. At that time they thought (and this was told to me afterwards) that I was the female of the Moon-Queen's little animal-pet.

'As this or as something else, I was carried to the town hall, where I noticed from the 'buzz and the gestures made by the people and the magistrates that they were arguing what I might be. Finally, one of them, who kept rare beasts, begged the magistrates to lend me to him, until the Queen sent for me to live with her male animal.

'This man took me to his home; he taught me to play the buffoon, to throw somersaults, to make grimaces, and in the afternoon he took money at the door for showing me.*

'One day, when I was tied to the end of a rope with which the mountebank made me leap to amuse the mob, one of those looking on asked me, in Greek, who I was. I was vastly surprised to hear him speak as we do in our world, and I told him about my voyage. He tried to console me and said "Well, my son, you suffer the penalties for the failings of your world at last. Here, as there, exists a mob which cannot endure the thought to which it is not accustomed. If somebody from this earth should rise to yours and have the boldness to call himself a man, your learned men would have him smothered as a monster, or as an ape possessed by the devil."

'He promised me that he would inform the Court of my disaster, and he added that as soon as he looked at me he knew I was a man, because he had travelled to the world from which I had come and knew that my world was the Moon. "The people of your world became so stupid and so gross that I lost all the pleasure we once had in teaching them," he said. "You must, of course, have heard of us. In your world, they call us

* Swift used this theme in Gulliver's voyage to Brobdingnag.

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Oracles, Genii, Fairies, Lemures, Hobgoblins, Shades, Ghosts, Spectres, Phantoms. . . .'

The friendly demon then told Cyrano that he was an inhabitant of neither the earth nor the Moon. He had been born on the sun, but owing to the longevity of its inhabitants the sun was over-populated and many demons were sent to other worlds. After his life on earth he had settled on the Moon "because the Moon dwellers are lovers of truth". While the demon was talking about the sun and its people, Cyrano's tormentor pulled at the cord compelling him to dance with renewed vigour for the amusement of spectators. The crowd could not understand the conversation between the demon and Cyrano, conducted in Greek.

'On the' Moon two idioms are used, one which serves the nobles, while the other is peculiar to the ordinary people. The language of the nobles is simply different tones not articulated and very much like our music when no words are added to it. When they are tired of speaking, they take a lute or some other instrument, and communicate their thoughts as easily as by the voice.

'The second idiom which is used by the people, is carried by the movement of the limbs, and certain parts of the body mean a whole speech. For example, the movement of a finger, of a hand, of an ear, of a lip, of an arm, of a cheek, will make a sentence; others such as a wrinkle in the forehead, different shiverings of the muscles, turnings of the hands, stamping the foot, contortions of arms, are used to designate words. As it is their custom to go quite naked, when they talk their limbs move so briskly that it does not seem that a man is talking but a body trembling.'

'The demon came to visit me almost every day and his conversations helped me to endure the miseries of captivity. One

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morning a beast-man whom I did not know came into my cage, and having stroked me, gently lifted me up, cast me upon his back and carried me off.'

The beast-man was none other than the friendly demon in disguise, and he carried Cyrano to the palace of the Moon King. On the way they stopped at an inn.

'I was led into a magnificently furnished room but I saw nothing prepared to eat. Such lack of meat when I was perishing of hunger compelled me to ask my guide where the table was laid.

'I did not hear what he replied, for three or four young boys came up to me and with great civility undressed me to the shirt. Then my guide asked me how I should like to begin the meal. I replied: "A soup!"'

'Immediately I smelted the odour of the most succulent simmering that ever hit the nose of a rich sinner. I tried to get up to track down the source of the agreeable vapour, but my guide prevented me. "Finish your soup," he said, "and then we will have something else."

"But where the devil is the soup?" I cried in a rage.

'It was only then that my guide explained. The Moon-dwellers live on nothing but vapour. The art of cookery here is to enclose in large, specially moulded vessels the fumes which rise from meats and, having collected several kind, and several tastes, they open the vessel which holds this odour, and then another, and then another until the appetite is satisfied.

'He had scarcely finished when I smelted successively so many agreeable and nourishing vapours that I felt completely satisfied in less than a half-quarter of an hour.'

The friendly demon explained the culinary art of the Moon in some detail and Cyrano went up to his bedroom.

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‘At the top of the staircase we were met by a man who conducted me to a cabinet whose floor was covered with orange flowers to the depth of three feet, and took my demon into another filled with carnations and jasmine. Seeing that I was amazed at this magnificence he told me this was the method of making beds in the Moon. At last we lay down in our chambers and as soon as I stretched out on my flowers I perceived by the light of thirty large glow-worms, enclosed in a crystal, the three or four young boys who had undressed me at supper. One of them began to tickle my feet, another my thighs, another my flanks, another my arms—so delicately and nicely that in less than a moment I fell asleep.’

The next morning Cyrano and his demon left the inn, and the demon gave the landlord a paper. Cyrano inquired if this were a note for the amount of the bill, but the demon said the paper bore a poem, the currency of the Moon. When a poet had composed some verses he carried them to the mint, where the official poets of the kingdom held court. Good poems were declared legal tender. “No one dies of hunger on the Moon except blockheads who cannot write verses,” said the demon.

Cyrano was then conducted to the palace of the Moon King where he was kindly received. There he met another recent arrival on the Moon, a Spaniard who had been drawn up from the earth by huge birds. This of course was Domingo Gonsales. Bishop Godwin’s book *Man in the Moon* appeared in a French translation in 1648 and Cyrano had obviously read it shortly before writing his *Voyage to the Moon and the Sun*. A friendly conversation with Gonsales was interrupted by the King of the Moon.

‘The King commanded his monkey-keeper to take us away, with the strict order to make the Spaniard and me lie together to multiply our species in the Moon kingdom. The King’s

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command was carried out in every point and I was glad of this because of the pleasure I took in having some one to converse with. One day my male—for they took me for a female—told me that the real reason that had obliged him to wander all over the earth and finally to abandon it for the Moon, was that he could not find a single country where even the imagination was free.

“Observe,” he said, “unless you wear a square cap, a chaperon or a cassock, whatever excellent things you may say, if they are against the principles of these doctors and priests, you are an idiot, a madman or an atheist.”

Cyrano and Gonsales had many long discussions, passing the time agreeably, “as the little Spaniard had a pretty wit.”

‘Our conversation took place only at night, because from six o’clock in the morning until the evening, the crowds of people who came to look at us in our lodgings prevented it. Some of the Moon people threw stones at us, some nuts, some grass. They fed us every day at regular hours and the Moon King and Moon Queen themselves often were pleased to touch my belly to find out if I were pregnant, for they burned with an extraordinary desire to breed a race of these little earth animals.

‘I do not know whether I was more attentive to their grimaces and intonations than my male, but I learned to understand the Moon language and to use it a little.

‘Soon the news ran through the Moon kingdom that there had been found two wild men, smaller than others, who from some defect in their fathers’ seed possessed fore-legs too weak to walk upon. This belief would have taken root, had not the Moon priests opposed it. They said that it was a horrible impiety to believe that not only beasts but monsters were of their species.

‘Every day in my lodgings I heard the priests make up these or similar tales. At length they so influenced the people’s con-

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science that it was decreed I should at best be held for nothing more than a plucked parrot, because I had only two feet like a bird.

'I was put in a cage by a special order of the upper council. Then the Moon Queen's falconer came every day to whistle to me as we do with starlings. I was happy in that my cage did not lack food, and from the follies with which my spectators deafened my ears I learned to speak like them.'

'When I understood the idiom sufficiently to express my conceptions, I showed them how I could talk. Already in gatherings, people were speaking of nothing but the prettiness of my jests; and the esteem for me grew to such a point that the Moon clergy were forced to publish a decree forbidding anyone to believe that I possessed reason.'

'However, opinion what I was divided the Moon town into two factions and the party which took sides in my favour increased every day. At length my supporters demanded an assembly of the judges to resolve this religious dispute.'

Cyrano describes his trial which mainly consisted of lengthy dissertations on the merits of Aristotle's philosophy and presented the author with an opportunity of making acid comments on politics, war, autocracy, and democracy, the rule of law, science and, particularly, religion, all of which had very little to do with the Moon but everything with the state of affairs in France and Europe.

The prisoner of the Moon dwellers had some consolation in his predicament. During the trial many ladies had shown sympathy and thrust scraps of food into his cage, and "the prettiest of them all", a lady-in-waiting to the Queen of the Moon, "conceived a certain friendship for me."

'Once when we were alone I disclosed to her the mysteries of our religion and told her of our bells and relics. She was so moved

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by joy that she vowed with tears in her eyes that if ever I were able to fly back to earth she would gladly follow me.

'One day I woke up early with a start and saw her tapping against the bars of my cage.

"I have good news for you," she said, "yesterday the council declared war against a great king and I hope, with the bustle of preparation and the departure of our monarch, to find an opportunity to set you free."

'She did not say any more on that occasion, because she was afraid to be found alone with me at so early an hour. On the Moon unchastity is no crime; on the contrary, except for condemned criminals any man may take any woman, and similarly a woman may cite a man before the law-courts if he has refused her. But she dared not frequent me publicly, because the priests had declared that women (who visited me) reported I was a man, only to hide the execrable desire to mingle with beasts and to commit shamelessly sins against Nature with me.'

'For this reason I remained a long time without seeing her or any of her sex.

'In spite of the war, somebody must have relighted the quarrels about the definition of what I was, for just as I was resigned to die in my cage, they came for me again to examine me.'

This time the proceedings centred on Cyrano's refusal to acknowledge that the Moon was the world and that God created it in six days. His contention that he had come from the earth, which the Moon dwellers considered to be the Moon, was regarded as sacrilegious. His inquisitors nearly succeeded in having him "condemned to water, which is their method of exterminating atheists". But, in the end, Cyrano decided to recant and the King of the Moon pronounced the following sentence.

"That henceforth I should be considered a man; as such set

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at liberty, and that the punishment of being drowned should be modified into making amends in which I should publicly disavow having taught that the Moon was not a World."

'When the sentence was pronounced I was taken out of the palace. As a mark of ignominy I was dressed very magnificently; I was borne along on the seat of a superb chariot and was drawn by four princes. At every cross-roads in the town I was obliged to declare as follows:

"‘People, I declare to you that this Moon is not a Moon, but a World; and that Earth is not a World but a Moon. For your priests think good that you should believe this.’"

'After I had cried the same thing in the five principal squares of the Moon city, I perceived my defender holding out his hand to help me to get down.

'I was vastly surprised to recognize him when I looked in his face—for he was my demon. We embraced each other for an hour.'

The demon brought Cyrano to his home and introduced him to the landlord's young son. He also invited two professors of the Moon academy. Cyrano was soon deep in a conversation about the "subject of philosophy taught in the Moon world". The two old professors treated him with great respect, bowing profoundly in his direction. When Cyrano inquired the reason for this, he was told that in the Moon the old people rendered every deference and honour to the young; fathers obeyed their children as soon as they had attained the age of reason. They also explained to him the architecture in the Moon.

'Our cities are divided into the mobile and the sedentary. The mobile are constructed as follows: the architect builds each palace of very light wood and inserts four wheels underneath. In the thickness of one of the walls he places large and numerous bellows, whose nozzles pass in a horizontal line through the upper

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floor from one gable to the other. When it is desired to move the town somewhere—for we change our air at every season—each one hangs out a number of large sails from one side of his house in front of the bellows; then he winds up a spring to make them play and in less than eight days the continuous blasts vomited by these windy monsters against the sails carry their houses, if they wish, more than a hundred leagues.

'The architecture of the second kind, which we call sedentary, is as follows: the houses are almost like your towers, except that they are made of wood and that in the middle they have a large strong screw which goes from the cellar to the roof to raise or lower them at will. The earth underneath is hollowed out as deep as the building is high, and the whole thing is constructed in this manner so that, when the frosts begin to fall cold from the sky, they can lower their houses to the bottom of the hole by turning them: and then they cover the tower and the hollow part about it with large skins and so shelter themselves from the inclemency of the air. But as soon as the soft breath of spring makes the air milder, they return to the daylight by means of the large screws.'

The discussion then turned to more abstract topics and the Moon philosophers explained some of the beliefs held in the Moon to "the little animal from earth". Finally the time came for their departure and the demon went to collect some torches to guide the visitors home.

'He brought with him crystals filled with glow-worms to lighten the room, but these little fire insects lose much of their light when they are not freshly gathered and as these were ten days old they hardly shone at all. My demon did not wait for the company to be inconvenienced by this.

'He went up to his room and returned with two fire balls, so brilliant that we were all surprised he did not burn his fingers.

"These incombustible torches," he said, "will serve us better

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than the cluster of worms. They are sun rays which I have purged of their heat; otherwise the corrosive qualities of its fire would have dazzled and hurt your sight. I have extracted the light and shut it in these transparent balls I am holding. This should not be a matter of great surprise to you: I was born in the Sun and so it is no more difficult to me to condense the rays which are the dust of that world than for you to collect the dust or atoms which are the pulverized earth of this world."

'When we had finished praising this child of the Sun, it was late, and our young host sent his father home with the two philosophers, with a dozen balls of glow-worms hanging from his four legs.

'The next morning my demon came in and told me he had just returned from the palace, whence he had been sent for by my friendly lady-in-waiting of the Queen. She had inquired after me and said she still persisted in keeping her word that she would gladly follow me if I would take her with me to my own world.

"I have promised to help her design with all my ability," the good demon continued, "and for this purpose to invent a machine capable of holding three or four persons, in which you can rise up together. From today onwards I shall apply myself seriously to the execution of this project. To amuse you during my absence here is a book which I brought from my native sun. It is called *A Voyage to the Sun*. I am also giving you another, which I rate more highly, it is on the great works of the philosophers of the Sun, composed by one of the greatest wits of that land."

'He had scarcely left me when I began to examine attentively my books. The boxes, that is to say their covers, seemed to me admirable for their richness. One was carved from a single diamond, incomparably more brilliant than ours; the second appeared to be a monstrous pearl cleft in two.

'At the opening of the box I found something in metal almost similar to our clocks, filled with an infinite number of little springs and imperceptible machines. It was a book indeed, but a

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miraculous book without pages or letters. It was a book to learn from where eyes are useless, only ears are needed.

'When' someone wishes to read he winds up the machine with a large number of all sorts of keys. Then he turns the pointer towards the chapter he wishes to hear, and immediately, as if from a man's mouth or a musical instrument, this machine gives out all the distinct and different sounds which serve as the expression of speech between the noble Moon-dwellers.*

'This present occupied me for more than an hour, and then hanging the book-machine upon myself like earrings, I went out to walk in the town. I had not passed out of the street which ran opposite our house when towards the other end I saw a large number of mourning people. Four of them carried on their shoulders a sort of coffin wrapped in black.'

'I asked a bystander what was the meaning of this procession so similar to a funeral in my own country. He replied that a wicked man, whose name was expressed among the people by a blow on the right knee, had been convicted of envy and ingratitude. Yesterday he had died and the Council had condemned him more than twenty years before to die a natural death in bed and to be buried after his death.'

'I began to laugh at this reply and the Moon-man asked me "Why?" "You surprise me," I replied, "by telling me that a long life, a peaceful death and a pompous burial which in my own world are signs of benediction, serve in this as an exemplary punishment."

"What!" retorted the man. "You consider burial a mark of benediction? Can you conceive anything more terrible than a corpse moving under swarms of worms, at the mercy of toads which gnaw its cheeks . . . the plague dressed in a man's body?

"That wretch you see carried there, in addition to the infamy of being cast into a pit, was condemned to have his funeral accom-

* Here Cyrano has a vision of the gramophone and phonograph, 250 years before the inventions of Edison and Berliner.

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panied by a hundred and fifty of his friends and as a punishment to them for having loved a man who was envious and ungrateful, they were bidden to appear at his burial with mournful faces. Had it not been for the leniency of the judges, who imputed his crimes in part to his lack of intelligence, his friends would have been ordered to weep.

‘Except for criminals everyone here is burned. And this is a very reasonable custom, for we think that fire separates the pure from the impure. Moreover, its heat draws to it by sympathy that natural heat which composed the soul and gives it the power to rise until it reaches some star, the world of people more immaterial than we. This flame being rectified still more by the subtlety of the world’s elements, finally composes one of the new citizens of that burning country.

“However this is not our best method of burial. When one of our sages comes to an age where he feels his mind grow weak and the ice of years impede the movements of his soul, he gathers his friends together for a sumptuous banquet. Then he puts before them the motives which have made him resolve to take leave of Nature, the small hope he has of being able to add anything to his good actions. The friends either grant him the favour—that is they order him to die—or they severely command him to live. When the majority have placed the disposition of his life in his hands, he announces the day and place to his dearest friends. They purge themselves and fast for twenty-four hours.

“When they come to the sage’s house, they sacrifice to the Sun and enter the room where the hero awaits them lying upon a ceremonial bed. Each one in turn goes to embrace him. When it comes to his best friend, the friend kisses him tenderly, leans upon his stomach joins mouth to mouth, and with his right hand plunges a dagger in his heart.

“The lover does not remove his lips from those of his beloved until he feels he is dead. He then withdraws the steel from his breast, places his mouth on the wound, and drinks his blood and

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continues to suck until he can swallow no more. Another succeeds him immediately and they carry the first to a bed. When the second is satiated he is taken away to a bed and gives place to a third. Finally, when they are all satiated, after about four or five hours, they bring to each of the friends a girl of about sixteen or seventeen. During the next three or four days they enjoy the pleasures of love, and they are fed exclusively on the dead man's flesh, which they eat raw, so that if anything is born from these embraces they may be almost sure it is their friend who lives again."

'I did not give this man the opportunity of discoursing any further. I left him there and continued my walk. Although I cut it short, the time I spent on the peculiarities of the sights and in visiting certain districts of the Moon town made me arrive more than two hours after dinner was ready. They asked me why I came so late.

"It is not my fault," I replied to the cook, who was complaining of it, "several times in the street I asked what time it was, but they only answered by opening the mouth, clenching the teeth and writhing the face askew."

"What!" cried everybody, "you did not know they were telling you the time that way? It is a convenience which permits to dispense with a watch. With their teeth they make so exact a dial that when they wish to tell someone the time, they simply open their lips and the shadow of their nose falling upon them marks the hour as if upon a dial. Now, in order that you may know why everyone in the Moon has a large nose, learn that as soon as a woman is delivered the midwife carries the child to the Prior of the Seminary. And, at the end of a year his nose is measured before the assembly of experts by the Syndic of Noses. If by this measure the nose is found too short, the child is reputed a 'Snub-nose' and handed over to the priests, who castrate him. You will perhaps ask the reason of this barbarity, and how it happens that we, among whom virginity is a crime, establish con-

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sistence by force? Learn then that we act in this way from thirty centuries of observation, showing that a large nose is a sign over our door that says: 'Here lodges a witty, prudent, courteous, affable, generous, and liberal man,' and that a small nose is the signpost of the opposite vices. That is why we make eunuchs of our snub-nosed children."*

'He was still talking when a man came in completely naked. I immediately sat down and put on my hat to do him honour, for in the Moon-world these are marks of the greatest respect one can show a man.

"The authorities," said he, "desire that you will inform the magistrates before leaving for your world. A mathematician has just promised the Council that if you will construct a certain machine—after reaching your country—which he will show you how to make, he will draw your world to ours and join it to our globe."

'As soon as he was gone, I asked the young host: "Tell me what is meant by that bronze piece, shaped like our parts of shame, which hung from that man's belt? During the time I lived at the court in a cage I saw many of them, but as I was always surrounded by the Queen's waiting-women I feared to be disrespectful to their sex and rank if I directed the conversation to so private a matter in their presence.

"Here the females no more than the males would be so ungrateful as to blush at the sight of that which made them," he replied, "the virgins are not ashamed to respect it. Know then that the belt with which the man is honoured and upon which hangs like a medal the shape of a virile man, is the symbol of a gentleman and the mark which distinguishes a noble from a commoner."

"This seems to me a most extraordinary custom," I said laughing, "since in my world to wear a sword is the mark of nobility."

* Cyrano, the owner of a very large nose, pays himself a handsome compliment.

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'He exclaimed: "My little man, the nobles in your world are mad to parade an instrument which is the mark of the hangman, which is only forged for destruction and is the enemy of everything that lives. And just as mad to hide a tool without which we should be in the category of things that are not. You call that tool 'the parts of shame', as if there were anything more glorious than to give life and anything more infamous than to take it away."

'During this conversation we continued to dine and as soon as we arose from our beds we went into the garden to take the air. The diversity and the beauty of the place delayed our conversation for some time.'

But not for long. Conversation turned to the immortality of the soul. The Christian faith and the Church were subjected to criticism during which the young host uttered some blasphemous remarks.

'At this moment there was a knock on the door of our room and a large black, hairy man came in. He approached us, seized the blasphemer by the middle and carried him off up the chimney. My pity for the wretch's fate made me to clasp him, in order to drag him from the black man's claws, but this hairy giant was so powerful that he carried us off both, and in a moment we were up among the clouds.

'I was obliged to grasp him tightly now, not from love of my neighbour, but from fear of falling.'

'After passing I know not how many days in travelling through the sky, without knowing what would become of me, I saw I was approaching our world.'

'Already I could distinguish Asia from Europe and Europe from Africa.'

'And now I was so near that I could not lift my eyes from Italy, when my heart told me that this Devil was, no doubt,

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carrying my host to Hell, body and soul, and that he was just passing by the way of our earth, because Hell is in its centre.

'But soon I forgot this thought and all that had happened to me since the Devil had been my carriage, through the fear I felt by the sight of a flaming mountain which I almost touched. The sight of this burning spectacle made me cry out: "Jesus Maria!"'

'I had scarcely finished my cry when I found myself lying upon the grass of a little hill with two or three shepherds around me, reciting litanies.

"Oh!" I cried, "praised be God. At last I have found Christians in the world of the Moon. Tell me, my friends, in what province of the Moon am I now?"

"In Italy," they replied. "What? Is there an Italy in the world of the Moon also?"

'I had still reflected so little of this miraculous accident that I had not perceived they were speaking to me in Italian, and that I was replying in the same tongue.

'When, in the end I recognized that I was once more in this world, I let myself be taken to the peasants' village. But as soon as I arrived at its gates, all the dogs of the village came rushing upon me and had not my fear caused me to rush into a house and shut the door against them, I should infallibly have been devoured.

'A quarter of an hour afterwards, while I was resting in this house, all the dogs of the Kingdom, I verily believe, could be heard in a turmoil outside. All kinds from the bulldog to the lapdog could be seen howling with a most terrible fury.

'This caused no little surprise to all the people who saw it; but I realized that these animals were infuriated with me because of the world whence I came. For, I said to myself, since the dogs are accustomed to bay the Moon they would have thrown themselves upon me because I smelt of the Moon, whose odour annoys them.

'I exposed myself to the sun stark-naked on a terrace, to cleanse

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myself from this bad air. I dried myself some four or five hours, at the end of which I went down, and the dogs no longer smelling the influence of the Moon which had made me their enemy, all returned home.

‘The next morning I departed for Rome, where I admired the ancient ruins, and where I rested for a fortnight as the guests of Monsieur Cyrano, my cousin, who lent me money for my return voyage to France. I went to Civitavecchia and at the port inquired when a ship would leave for Marseilles. When I was embarked my mind was wholly occupied in ruminating on the wonders of my voyage. A thousand times I admired the providence of God which had placed those naturally impious men in a situation where they could not corrupt His chosen, and had punished them for their pride by giving them up to their own self-conceit. And I do not doubt that so far He has put off sending someone who preached them the Gospel, because He knew they would abuse the occasion and that this resistance would only serve to make them merit a harsher punishment in the next world.

‘Realizing that this was the end of my labours, and to honour my promise given to the Council of the Moon-world, I asked M. le Bret, my dearest friend, to publish the story of my voyages to the Moon and the Sun, together with my reports of some other of my journeys.’

CHAPTER EIGHT

The First Flying Saucer

THE practice of using imaginary worlds to satirize affairs on Earth was common to many writers and philosophers in the seventeenth and eighteenth centuries. By attacking the Moon and its government, authors could avoid many of the obstacles presented by censorship and castigate the authorities of their native lands.

Notable among such English writers was Daniel Defoe, who suffered imprisonment and pillory for non-conformist beliefs and assaults upon James II and his ministers. Defoe pressed the Moon into service for political purposes, in pamphlets and in articles in his "Review", the first English weekly journal, which he edited in prison.

In 1705, he published *The Consolidator or Memoirs of Sundry Transactions from the World of the Moon*, the first of his full-length novels to exploit the greater freedom of speech to be found on the earth's satellite.

The book was a biting satire on most of the follies of a time when English and European politics were subjected to thinly veiled parody and he dealt even more forcefully with the social and economic conditions, the current religious feuds, including the persecution of the Dissenters, and with the shortcomings of Parliament. England and Scotland were transplanted to the unclouded Moon and Defoe's adversaries were exposed as lunar evildoers. To take one example, references to "lunar high-fliers",

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ruthless despots who exacted large sums of money from their subjects, obviously alluded to the Earl of Nottingham and the group of leading politicians then often described in England as "High-flyers". They were the men who "had built their castles in the sky".

Our main interest is, however, in the somewhat sketchy mechanics of Defoe's expedition to this mirror world. Although they played a secondary part in Defoe's scheme of things, they are significant in that they comprised an odd mixture of literary fancies derived from a classical background and haphazard gleanings from the scientific harvest just then beginning to be gathered in.

Defoe's machine which traversed outer space, was an engaging but unlikely vehicle made of 513 feathers. He gave a somewhat perfunctory description of the way it worked, but the most significant feature of its design was that the number of feathers corresponded exactly to the number of Members of Parliament.

On the Moon Defoe found additional equipment, observatories and telescopes, beside which the 200-inch reflector of Mount Palomar and the radio telescope of Jodrell Bank would have faded into insignificance. Through the lenses of some of these lunar telescopes the observer "could see all the lands and seas in all the habitable planets". Others provided "second sight", permitting the user "to look into non-entity" and to see beyond death. Also, there were "political glasses" which enabled men on the Moon to see "state politics in all its meanders, shifts, turns, tricks and contraries". Defoe employed all these glasses with enthusiasm, using "clear sight" and "far sight" to examine the political issues and social problems of his day. His book was a study of the "Glorious Revolution" which dethroned James II and brought William of Orange to England, as well as of the early years of Queen Anne's oppressive reign.

In the view of one of his biographers, William Lee, the imaginative power of *The Consolidator* is unsurpassed in any of Defoe's

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other works, including *The Life and Adventures of Robinson Crusoe*, which was published fourteen years later. This claim is open to doubt, but parts of *The Consolidator* remain well worth quoting when nearly all Defoe's political satire has been jettisoned.

In the early part of the book Defoe indulged in the literary fashion of "chinoiserie", glorifying Chinese culture and inventiveness. By doing so, he gratified upon the feelings of those European contemporaries who flattered themselves that their age was one of unimpeded progress and enlightenment, based upon the new science which they alone had mastered.

"Centuries earlier than the Europeans," wrote Defoe, "the Chinese had many sorts of learning, which these parts of the world never heard of." Furthermore "they had all those useful inventions which we now admire ourselves and which were in use in China, long before these parts of the world were inhabited". After dealing with "the monstrous ignorance and deficiencies of European science", Defoe turned to "the famous Miro-cho-cho-lasmo, Vice-Admiral of China, who was not a native of this world, but was born in the Moon, and coming hither made strange discoveries and inventions". These so impressed the Emperor of China he prevailed upon the Admiral to pause a while and improve the Chinese "in the exquisite accomplishments of the lunar regions".

Defoe warmed to his Admiral-from-the-Moon with a description of the gentleman's literary output which made him a worthy precursor of United Nations technical missions. Among other achievements the Admiral was responsible for writing 216 volumes on Chinese navigation "printed about 2,000 years before the Deluge", found by Defoe in the library of Tonkin, next to 365 volumes by Augro-machi-lanquaro-zi, "the most ancient mathematician of China". Many great inventions were described by Ibra-chizra-le-peglizar, the Historiographer Royal of the Emperor of China, and printed on leaves of vitrified diamond.

Having established that China's knowledge and ability to do

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everything many centuries before anyone else "came down from the world of the Moon", Defoe declared: "No man need wonder at my desire to go up to the world in the Moon . . . since in the search of knowledge and truth wiser men than I have taken as unwarrantable flights and gone a great deal higher."

The Consolidator was a volume of some 70,000 words and there is room here for only a few passages describing the machine and something of the procedures on the Moon. There is no account of the actual voyage; instead Defoe adopted the convenient technique whereby the traveller after "being placed in this airy chariot drinks a certain dosing draught, that throws him into a gentle slumber, and dreaming all the way, never wakes till he comes to the journey's end".

'Above all the inventions for making the voyage to the Moon, I saw none more pleasant or profitable than a certain engine formed in the shape of a chariot, on the backs of two vast bodies with extended wings, which spread about fifty yards in breadth, composed of feathers so nicely put together that no air could pass.

'As the bodies were made of lunar earth, which would bear the fire, the cavities were filled with an ambient flame, which fed on a certain spirit deposited in a proper quantity to last out the voyage.

'The fire was so ordered as to move about such springs and wheels as kept the wings in a most exact and regular motion, always ascendant.

'These engines are called in their country language Dupe-kasses and according to the ancient Chinesc or Tartarian, Apelanthukanistes, in English a Consolidator.

'The composition of this engine is very admirable, for it is made of feathers, the number of which is 513. They are all of a length and breadth exactly, which is absolutely necessary to the floating figure, or else one side or any part being wider or longer than the rest, it would interrupt the whole motion of the engine.

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There is one extraordinary feather which is placed in the centre, and is the handle, or rather rudder of the whole machine. This feather is every way larger than its fellows; it is almost as long and broad again; but above all, its quill or head is much larger, and it has as it were several small bushing feathers round the bottom of it, which all make but one superintendent feather, to guide, regulate, and pilot the whole body.'

'It is true this engine is frequently assaulted with fierce winds and furious storms, which sometimes drive it a great way out of its way; and indeed, considering the length of the passage and the various regions it goes through, it would be strange if it should meet with no obstruction.

'There are a great many other internal blasts which proceed from the fire within, which sometimes not circulating right, breaks out in little gusts of wind and heat, and is apt to endanger setting fire to the feathers.

'The engine suffers frequent convulsions and disorders from these winds, and which, if they chance to overblow very much, hinder the passage, but the negative feathers always apply temper and moderation and this brings all to rights again. When one thing is tacked to another, and properly consolidated into one mighty Consolidator, no question but whoever shall go up to the Moon will find himself so much improved in this wonderful experiment, that not a man ever performed that wonderful flight but he certainly came back again as wise as he went.

'The first voyage I ever made to this country was in one of these engines and now it may be expected I should give some account of the country, for I can give but little of the road. Only this I understand, that when this engine, by help of these artificial wings, has raised itself to a certain height, the wings are as useful to keep it from falling into the Moon as they were before to raise it, and keep it from falling back into this region again.

'This may happen from an alteration of centres; and gravity

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having passed a certain line, the equipoise changes its tendency; the magnetic quality being beyond it, it inclines of course, and pursues a centre, which it finds in the lunar world, and lands us safe upon the surface.

'I was told I need take no bills of exchange with me nor letters of credit, for that upon my arrival the inhabitants would be very civil to me; that they never suffered any of our world to want anything when they came there; that they were very free to show them anything, and inform them in all needful cases, and that whatever rarities the country afforded should be exposed immediately.'

'I shall not enter into the customs, geography, or history of the place, only acquaint the reader that I found no manner of difference in anything natural. All was exactly as is here: an elementary world, peopled with folks, as like us as if they were inhabitants of the same continent, but in a remote climate.'

'The inhabitants were men, women, beasts, birds, fishes, and insects, of the same species as ours, though some excepted. The men no wiser, better, nor bigger than here; the women no handsomer or honester than ours.'

'They had the same sun to shine, the planets were equally visible as to us, and their astrologers were as busily impertinent as ours, only that those wonderful glasses hinted before, made strange discoveries that we were unacquainted with. By them they could plainly discover that this world was their moon, and their world our Moon. When I came first among them, the people that flocked about me distinguished me by the name of the Man that came out of the Moon.'

Defoe then described the miraculous telescopes and glasses.

'I found myself capable to see and distinguish things at the distance of a hundred miles and more. Seeking some information on this point, I was acquainted by the people that there was a cer-

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tain philosopher that could give me a very good account of things.

'It is not worth while to tell you this man's lunar name, or whether he had a name or no. It is plain it was a Man in the Moon. At my first coming to him, he asked me if I came from the world in the Moon. I told him, no; at which he began to be angry, and told me I lied; he knew whence I came as well as I did, for he saw me all the way. I told him I came to the world of the Moon, and began to be as surly as he. It was a long time before we could agree about it. He would have it that I came *down* from the Moon, and I that I came *up* to the Moon.'

'From this we came to explications, demonstrations, spheres, globes, regions, atmospheres, and a thousand odd diagrams to make the thing out to one another.'

Apparently travel in outer space was liable to involve that desperate recourse to pencil and paper with which so many English-speaking tourists abroad have always been familiar. However, for Defoe and his mentor, paper and pencil did at least enable them to reach understanding, satisfying themselves "that these worlds were sisters, both in form, function and all their capacities—in short, a pair of moons and a pair of worlds, equally magnetical, sympathetical and influential".

'After we had settled the debate, I desired him to show me some plan or draft of this new world of his, upon which he brought me out a pair of very beautiful globes, and there I had an immediate geographical description of the place.

'I found it less by x degrees than our terrestrial globe, but more land and less water; and as I was particularly concerned to see something in or near the same climate with ourselves, I observed a large extended country to the north, about the latitude of

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50° to 56° northern distance; and inquiring of that country, he told me it was one of the best countries in all the Moon; that it was his native climate, and he was just going to it and would take me with him.

'He told me in general the country was good, wholesome, fruitful, rarely situate to trade, extraordinarily accommodated with harbours, rivers, and bays for shipping, full of inhabitants, for it had been peopled from all parts, and had in it some of the blood of all the nations in the Moon. He told me, as the inhabitants were the most numerous, so they were the strangest people that lived; both their natures, tempers, qualities, actions, and way of living was made up of innumerable contradictions; that they were the wisest fools and the foolishest wise men in the world, the weakest, strongest, richest, poorest, most generous, covetous, bold, cowardly, false, faithful, sober, dissolute, surly, civil, slothful, diligent, peaceable, quarrelling, loyal, seditious nation that ever was known.'

'He informed me that in this new country they had very seldom any clouds at all, and consequently no extraordinary storms, but a constant serenity. Moderate breezes cooled the air, and constant evening exhalations kept the earth moist and fruitful; and as the winds they had were various and strong enough to assist their navigation, so they were without the terrors, dangers, shipwrecks, and destructions which we knew we were troubled with in this our lunar world, as he called it.'

At this point Defoe's companion demonstrated the miraculous glasses, one of which permitted Defoe to see the "state of nations" in Europe and enlarge upon them at length. Next he turned to the "second sight" glasses.

'This second sight has often been pretended to in our regions, and some famous old wives have told us they can see death, the soul, futurity, and the neighbourhood of them, in the counten-

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ance. By this wonderful art these good people (in the Moon) unfold strange mysteries; as under some irrecoverable disease to foretell death; under hypochondriac melancholy to presage trouble of mind; in pining youth to predict contagious love; and a hundred other infallibilities, which never fail to be true as soon as ever they come to pass.

'I cannot pass over a very strange and extraordinary piece of art which this old Moon man informed me of. That was an engine to screw a man into himself. Perhaps our countrymen may be at some difficulty to comprehend these things by my dull description, and to such I cannot but recommend a journey in my engine to the Moon.

'The machine contains a multitude of strange springs and screws and a man that puts himself into it is very insensibly carried into vast speculations, reflections and regular debates with himself. The machine has a very hard name for it in those parts, but if I were to give it an English name, it should be the Cogitator, or the Chair of Reflection.

'First, the person that is seated here feels some pain in passing some negative springs, that are wound up effectually to shut out all injecting, disturbing thoughts, and the better to prepare him for the operation that is to follow. . . . This operation past, there are certain screws that draw direct lines from every angle of the machine to the brain of the man, and at the same time other direct lines to his eyes, at the other end of which lines there are glasses which convey or reflect the objects the person is desirous to think upon.

Then the main wheels are turned, which wind up according to their several offices—this the memory, that the understanding, a third the will, a fourth the thinking faculty; and these being put all into regular motions, pointed by direct lines to their proper objects, assist one another to receive right notions and form just ideas of the things they are directed to. From thence the man is empowered to make right conclusions, to think and

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act like himself suitable to the sublime qualities his soul was originally blest with.'

The later chapters of *The Consolidator* were mainly concerned with religious strife in England and the oppression of the Dissenters. They also provided an important autobiographical study of Daniel Defoe himself, in his guise of a fugitive from England to the Moon. When he wrote *The Consolidator* he was forty-four years old and he had just been ruined financially for the second time. Yet he continued his battle against ignorance, intolerance and corruption with unbroken resolution.

Some years after the publication of *The Consolidator*, which provoked both bitter attack and high praise, two further books, *A Second and More Strange Voyage to the World in the Moon* and *A New Journey to the Moon*, were published anonymously. These were generally ascribed to Defoe but his most distinguished biographer, William Hazlitt, rejected them as plagiarisms. The unknown authors of these works merely paraphrased Defoe's satire and philosophy. However, they did add some details about the journey. Jet propulsion by an "ambient flame" was retained, but the feathers of *The Consolidator* became "boards" or "notches" which were attracted by a similar number of "catches" on the Moon. Thus the flying machine was not only propelled from the earth, but also enticed away from it. The author of the *New Journey*, which at one time appeared in a collection of fanciful stories fittingly entitled *The Diverting Jumble*, described the operation in this way.

'A number of notches is prepared to lay hold on the spokes of the chariot wheels, whereby the body of the engine, or chariot, is kept in a most regular and uniform motion . . . circularly drawn by a spring screw into the lunar world. For by the catches of the Moon's attraction we are loosened from the gravity we otherwise owe to our own globe, and so are transmitted . . . from our

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own more refined atmosphere into yours, without any damages of want of air, by the way for support and breathing, which are manifest hindrances to your journeying thither. . . . Besides, our Moon being by far the greater body, and in continual rotation, it is our world centre, and as it forcibly attracts our globe itself, so by its continual turning round naturally draws those engines into it, with the people that embark in them.'

The author, seemingly exhausted by his efforts to grapple with the theories of dimly-understood Newtonian physics, resorted to simple methods for the return journey, undertaken by a Moon philosopher, visiting the earth—his moon: The jet-propelled chariot became a glider. The descent was caused by "centrifugal power" thus: "Upon our inclination to return we only loosen the screw that was fixed to the Moon's attraction, and the pressure of your air at the surface being much grosser than our volatile bodies, immediately forces us back with a 'vis centrifuga', sufficient to send us out of the attraction of the Moon and throw us through the vast abyss, or vacuum, between the Moon and our world."

These writers found a ready sale for their works from which most of Defoe's satire and political philosophy had been eliminated. Their concern was the adventure story of travel to the Moon and the pamphlets were reprinted several times between 1710 and 1747.

* * *

Defoe transplanted England to the Moon. The other great English satirist of the eighteenth century, Jonathan Swift, nearly brought the Moon down to earth.

His other world was a "vast opaque body" between earth and sun, the first flying saucer, inhabited by people of outer space. As Marjorie Hope Nicolson observed in her study of the history of imaginary flight, the authors of space travel two

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centuries ago "were fascinated by everything grand, immense and vast. They yearned for bigger and better icebergs, thunderstorms, hurricanes, tempests, mountains, deserts; everything had to be larger than life". Father Joseph Galien, the French astronomer, discussing the possibility of a heavier-than-air flying machine seriously suggested the possibility of constructing a giant flying Noah's Ark "as large as my native town of Avignon, as high as a mountain and capable of transporting a whole army from France to Africa through the air".

Swift's *Floating Island of Laputa* was just such a slab of flying terrain, a lunar continent, hovering over the earth and dominating parts of it. His hero Lemuel Gulliver had hitherto confined himself to terrestrial adventures, Lilliput and Brobdingnag both being imaginary islands in the Pacific. In the *Voyage to Laputa* Gulliver left the earth and ventured into space.

Like Defoe, Gulliver began his journey in China. After an encounter with Japanese pirates, he was abandoned on an island.

'I slept very little, for the disquiet of my mind prevailed over my weariness, and kept me awake. I considered how impossible it was to preserve my life in so desolate a place, and how miserable my end must be. Yet I found myself so listless that I had not the heart to rise, and before I could get spirit enough to creep out of my cave, the day was far advanced.'

'I walked a while among the rocks. The sky was perfectly clear, and the sun so hot that I was forced to turn my face from it.'

'Of a sudden the sun became obscured, in a manner very different from what happens by the interposition of a cloud.'

'I turned back and perceived a vast opaque body between the earth and the sun, moving forward towards the island. It seemed to be about two miles high, and it hid the sun for five or six minutes. But I did not observe the air to be much colder, or the sky more darkened than if I had stood under the shade of a mountain.'

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'As the object approached nearer over the place where I was, it appeared to be a firm substance, smooth and shining very bright. I stood upon a hill about two hundred yards from the shore and saw this vast body descending almost to a parallel with me, at less than an English mile distance.

'I took out my pocket-perspective, and could plainly discover numbers of people moving up and down the sides of it, which appeared to be sloping.

'The natural love of life gave me some inward motions of joy and I was ready to entertain a hope that this adventure might help to deliver me from the desolate place.

'But at the same time the reader can hardly conceive my astonishment to behold an island in the air, inhabited by men, who were able, it seemed, to raise, or sink, or put it into progressive motion, as they pleased.'

Gulliver succeeded in attracting the attention of the space people "with the utmost strength of my voice", but they remained unmoved until apparently they received orders to rescue him. Some called out "in a clear, polite and smooth dialect, not unlike in sound to the Italian", and finally after much manœuvring lowered a long chain by which Gulliver was hauled up. He was now face to face with the space-men.

'Never till then have I seen a race so strange in their shapes, habits and countenances. Their heads were all reclined either to the right, or the left; one of their eyes turned inward, and the other directly up to the zenith. Their garments were adorned with the figures of suns, moons, stars, interwoven with those of fiddles, flutes, harps, trumpets, guitars, harpsicords and many more instruments of music. Some carried in the hands a short stick to which a blown bladder was fastened like a flail. In each bladder was a small quantity of dried peas or little pebbles, as I was afterwards informed. With these bladders they now and

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then flapped the mouths and ears of those who stood near them, of which practice I could not conceive the meaning.

'It seems the minds of these people are so taken with intense speculations that they neither can speak nor listen to others, without being roused by some external touch upon their organs of speech and hearing. For this reason those persons who are able to afford it always keep a Flapper—in their language a Climenole—in their family and never walk abroad or make visits without him.'

'The business of this Flapper is, when two or three more persons are in company, gently to strike with his bladder the mouth of the one who is to speak and the right ear of those to whom the speaker addresses himself.'

It was a world of mathematics and music into which Gulliver had arrived. Taken to the ruler of it, he was received kindly and invited to dinner.

'We had two course of three dishes each. In the first there was a shoulder of mutton, cut into equilateral triangles, a piece of beef into rhomboids, and a pudding in the shape of a cycloid. The second course w^s two ducks trussed up into the form of fiddles, sausages and puddings resembling flutes and harps, and a breast of veal in the shape of a harp. The servants cut our bread into cones, cylinders, parallelograms and several other mathematical figures.'

With the help of the Flappers, Gulliver had an amiable conversation, and he was supplied with a tutor, who brought him books full of astronomical figures and pictures of musical instruments in order, to teach him the language of Laputa.

'The knowledge I had in mathematics gave me great assistance in acquiring their phraseology, which depended much upon science and music. If they would for instance, praise the beauty of

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a woman, they describe it by rhombs, circles and ellipses. In the king's kitchen I observed all sorts of mathematical and musical instruments after which they cut up the joints. But their houses are very ill built, the walls bevelled, without one right angle in any apartment. The defect arises from the contempt they bear to practical geometry, which like mechanics they despise. They are dextrous enough upon a piece of paper on the management of the rule, the pencil and the divider, yet in the common actions of life I have not seen a more clumsy, awkward and unhandy people.'

The gentle folk of Laputa were then subjected to severe, Swiftian, criticism which, of course, was aimed at his English compatriots.

'They are very bad reasoners, vehemently given to opposition. Imagination, fancy and invention, they are wholly strangers to, nor have they words in their language by which those ideas can be expressed. These people are under continual disquietude, never enjoying a minute's peace of mind. Their apprehensions arise from several changes they dread in the celestial bodies. For instance that the earth by the continual approaches of the sun towards it must, in course of time, be absorbed and swallowed up; that the face of the sun will, by degrees, be encrusted with its own effluvia, and give no more light to the world; that the earth very narrowly escaped a brush from the tail of the last comet, which would have infallibly reduced it to ashes; and the next, which they calculated for one and thirty years hence, will probably destroy us.

'They are so perpetually alarmed with the apprehensions of these and the like impending dangers that they can neither sleep quietly in their beds, nor have any relish for the common pleasures and amusements of life. When they meet an acquaintance in the morning, the first question is about the weather, the sun's health, how he looked at his setting and rising.

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'The women of the island have abundance of vivacity; they feel contempt for their husbands and are exceedingly fond of strangers. Among these the ladies choose their gallants; but the vexation is that they act with too much ease and security, for the husband is always so wrapt in speculation that the mistress and lover may proceed to the greatest familiarities before his face, if he be but provided with paper and implements, and without his Flapper at his side. . . .'

After a month Gulliver had acquired "tolerable proficiency in their language" and was therefore able to gather much information about the space dwellers and their floating continent.

"The Flying or Floating Island is exactly circular. The bottom which appears to those who view it from below, is one entire adamant, shooting up to the height of about 200 yards. Above it lie the several minerals in their usual order, and over all is a coat of rich mould, ten or twelve feet deep. The declivity of the upper surface, from the circumference to the centre, is the natural cause why all the dews and rains, which fall upon the island, are conveyed in small rivulets towards the middle, where they are emptied into four large basins. From these basins the water is continually exhaled by the sun in the day-time, which prevents their over-flowing. Besides, as it is the power of the Monarch to raise the island above the region of clouds and vapours, he can prevent the falling of dews and rains whenever he pleases.

'At the centre of the island is a chasm, from whence the astronomers descend into a large dome. In this cave are twenty lamps continually burning, which from the reflection of the adamant cast a strong light.

'The greatest curiosity, upon which the fate of the island depends, is a loadstone of a prodigious size, in shape resembling a weaver's shuttle. It is in length six yards, and in the thickest part at least three yards over. This magnet is sustained by a very

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strong axle of adamant passing through its middle, upon which it plays, and it is poised so exactly that the weakest hand can turn it.

'It is hooped round with a hollow cylinder of adamant, four feet deep, as many thick and twelve yards in diameter, placed horizontally and supported by eight adamantine feet, each six yards high. In the middle of the concave side there is a groove twelve inches deep, in which the extremities of the axle are lodged and turned round, as needed.

'The stone cannot be moved from its place by any force, because the hoop and its feet are one continued piece with that body of adamant, which constitutes the bottom of the island. By means of this loadstone, the island is made to rise and fall, and move from one place to another. For this stone is endued at one of its sides with an attractive power, and at the other with a repulsive. Upon placing the magnet erect with its attracting end towards the earth, the island descends, but when the repelling extremity points downwards, the island mounts directly upwards.

'The loadstone is under the care of the astronomers who spend the greater part of their lives in observing the celestial bodies which they do by the assistance of glasses far exceeding ours in goodness. This advantage had enabled them to extend the discoveries much farther than astronomers in Europe, for they have made a catalogue of ten thousand fixed stars, whereas the largest of ours do not contain one third part of that number. They have likewise discovered two lesser stars, or satellites, which revolve about Mars, whereof the innermost is distant from the centre of the primary planet exactly three of his diameters, and the outmost five. They have discovered ninety-three different comets and settled their periods with great exactness.'

The ruler of the floating island, Swift maintained, could be the most powerful and absolute "Prince of the Universe" because

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his flying saucer enabled him to reduce any planet to obedience. He could use two methods:

'The first and the mildest course is by keeping the floating island hovering over a town or a land, whereby he can deprive them of the benefit of the sun and the rain, and consequently afflict the inhabitants with death and diseases. And if the crime deserves it, they are at the same time pelted from above with great missiles, against which they have no defence but by creeping into cellars and caves, while the roofs of their houses are beaten to pieces.'

'If they still continue to be obstinate, or offer to raise insurrections, the space king can proceed to the last remedy, by letting the island drop directly upon their heads, which makes a universal destruction both of houses and men.'

But this method of bombardment, would be an extremity to which the ruler of the giant flying saucer would seldom be driven, Swift reassures his readers. One reason for not employing this method of total war was shrewd self-interest:

'A sudden fall upon a city, particularly if it abounds in high spires or pillars of stone, might endanger the under-surface of the floating island, which, although it consists of one entire adamant two hundred yards thick, might happen to crack by too great a shock or burst by approaching too near the fires from the houses below. Of all this the people are well apprized and understand how far to carry their obstinacy, where their liberty or property is concerned. The king, when he is the highest provoked and determined to press a city to rubbish, orders his island to descend with great gentleness, out of a pretence of tenderness for his people, but indeed for fear of breaking the adamantine bottom.'

It was not surprising that Gulliver decided to leave Laputa,

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poised so precariously, if mightily, in outer space. He obtained the Laputan king's permission to descend to earth again and he landed on the island of Balnibarbi from where he embarked upon further adventures. His memories of his lunar hosts he summed up thus:

'Having seen all the curiosities of Laputa, I was very desirous to leave it, being heartily weary of those people. They were excellent for two sciences—mathematics and music—for which I have great esteem; but at the same time so abstracted and involved in speculation that I never met with more disagreeable companions . . .'

CHAPTER NINE

Gold Diggers on the Moon

THE prospect of colonizing the Moon was attractive enough. How much more compelling was the lure of gold and gems lying around in the lunar landscape, there for the taking?

Such an approach to the subject of the unexplored mysteries of the Universe was inevitable in England, in the era of the South Sea Bubble. The insidious promises by Lord Oxford's company of fabulous wealth arising out of trade with distant countries had caused ruination to thousands of gullible investors and a financial panic which shook Britain's economy. At the same time, in Paris, John Law's Mississippi and Louisiana swindles precipitated one of the worst inflationary crises, brought about the advent of worthless paper money and, in the words of one historian, "the beginning of modern speculative finance".

During this period the first commercial bid for the Moon was made by an anonymous satirist, who adopted the pseudonym of Captain Samuel Brunt.

His story *A Voyage to Cacklogallinia* appeared soon after the South Sea Bubble had burst. In parts it was strongly reminiscent of *Gulliver's Travels* and *The Adventures of Robinson Crusoe*, and its authorship was for some years ascribed to both Defoe and Swift.

In early chapters *A Voyage to Cacklogallinia* was, in effect, a non-celestial tour of the financial highways and byways of Walpole's England, in itself a devious and instructive journey.

Brunt, like so many other embryo invaders of the heavens,

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first appeared as a shipwrecked mariner, cast ashore on a remote island inhabited by intelligent birds.

The Chief Minister, a topmost bird, "sat on a gravely precarious perch." He tried to improve the kingdom's finances by putting "every brain at work to project methods for raising money". Captain Brunt was given an enthusiastic welcome. Coming as he did from the England of the South Sea Bubble he was soon enlisted to the corps of senior treasury feather-brains with the title of "Chief Project Examiner".

The projects he examined bore a marked similarity to those inflicted upon England during the first Hanoverian's reign. There were "taxes on cloth and all manner of stuffs", on corn and soot, ribbons and finery. There was all this and nationalization too, the Government "taking over all the torch trees which gave light and were used as candles". An unfamiliar imposition was a levy on the light of the sun, payable "according to the hours it was enjoyed: so that the poor peasants, who rose with the sun, paid for twelve hours daylight, and the nobility and gentry, who kept to their beds till noon, paid only for six hours".

But in Cacklogallinia inflation and the drain on the gold reserves were such that taxation alone could not avert the recurrent economic crises.

Volatilio, another top bird who held a high position in the treasury, devised a scheme for an expedition to the Moon, where there was gold in abundance. Brunt examined the project carefully, and objected. He tried to explain the great difficulties of a flight to the Moon but was sharply reminded that, while it might be impossible for humans to fly, this was natural to the winged subjects of the Emperor. Moreover, the Emperor needed the gold and Brunt was told to organize the expedition and to accompany it as chief scientific adviser. Considerable attention had to be paid to his transport as he did not possess wings. A palanquin was constructed for him, to be carried through the air by several Cacklogallinians.

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The Moon expedition had to be financed and the Cacklogallinians were more than equal to this aspect of the venture. "A company was erected, shares sold of the treasures we were to bring back from the Moon; and happy was he who could first subscribe." These subscriptions were sold "at two thousand per cent advantage", and soon many "vulgar speculators" were getting rich quickly. These operators on the Cacklogallinian Stock Exchange disdained to use their wings any more. Did the ruling classes in England walk? They did not. Then why should the prosperous Cacklogallinians who despite their humble origin had become the real power of the land?

They controlled the news service of the lunar expedition and published or withheld news according to the state of the market in the expedition's shares. This potent arrangement was made after an unsuccessful trial launching had been reported in detail. Volatilio, the Chief Projector, had sent messages back from the summit of the mountain off which the flyers were to jump. "Air too thin to continue there, without the help of humected sponges," reported Volatilio. Subsequently he warned that "there was a vast alteration in the air, which was very sensibly rarified".

Not surprisingly the market was depressed by these gloomy intelligences.

Bruht was ordered to take the matter of bird messages in hand in order to ensure that more encouraging reports arrived to improve the tone of the Stock Exchange.

The Cacklogallinian monarch himself gave the secret orders which left Brunt in no doubt as to the type of news required: "I need not tell you the Publick must be amused with Hopes of Success."

Nothing but good, encouraging news flowed in from the launching site. On the Exchange shares in the Moon Project soared. After a week of bullish markets, Volatilio decided the time had come for a test flight in which he and some of his fliers

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would investigate "the Orb of Influence of the Earth", the first stage of the journey to the Moon.

The research team carried out their mission successfully and Brunt reported that "the Air in the Upper Region was no rarer, and the cold if anything less intense". The shares continued their ascent.

So confident were the people of Cacklogallinia that their economic plight would be relieved by gold from the Moon, they danced in the specially illuminated streets of the town. Meanwhile, Brunt continued to record the truth behind the public excitement. Those in the know on the Stock Exchange had been manipulating the market very cleverly. Some courtiers having no shares left to sell, spread a rumour that Volatilio was lost and the Project in danger. Immediately utter confusion hit the stock market, the Moon shares fell to half their value.

When the shares had touched bottom, insiders, His Majesty among them, came back on to the market. They bought as many shares as possible at bargain basement prices. With buying completed, Brunt struck again with another cheerful item of City news: "Volatilio had returned safely." Immediately the shares rocketed upwards, to the dismay of those who had unloaded them during the slump.

After many trial flights, and as many fluctuations in the equities thereof, the expedition began in earnest. However, Brunt's account of the journey to the Moon and the landing on the planet was far less instructive than his journal of the Cacklogallinian financial transactions.

Volatilio, Brunt and the fliers took off from a mountain top and enjoyed an uneventful journey. After an hour and a half, Volatilio, who went ahead of the main party, found that the gravity of the air had ceased. He flew back to Brunt's palanquin, "folded his wings and came to me on foot, through the air, and told me I might get out and stretch my limbs. My Palanquineers stood still, and confirmed what he said; and more, that

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they had not for a quarter of an hour been sensible of my weight, which had lessen'd by degrees, so as not to be felt at all".

The travellers walked on air for a while and Brunt found that he "could with as much ease lift a Palanquin of Provisions, which did on earth weigh not less than 500-weight, as I could on our globe raise a feather". However, there were some unpleasant surprises ahead.

The Cacklogallinian gold diggers could obtain no co-operation whatever from the Moon dwellers who were "spirits of terrestrial men", souls "loosen'd from the body by sleep", and indulging upon the Moon "in passions which predominate, or undergo the misfortunes they fear while they are in their own world". They suffered from profound complexes and neuroses and it was wellnigh impossible to comprehend "the consciousness of their unknown motives".

There was plenty of gold on the Moon, but the Selenites, troubled ascetics that they were, neither coveted it nor were prepared to share it. Plagued by their consciences they passed their days in careworn contemplation, waiting for the ultimate day "when Understanding would return to the Creator", an event for which they had the same word as Cacklogallinians: death. Undeterred by the Selenites' negative attitude towards gold, Volatilio persisted in his efforts to acquire some. Busily he drafted contracts for concessions and the setting up of companies. All his take-over bids were in vain, confronted as he was by the lunar economic system, or rather a non-economic system. Eventually, Volatilio's mercenary approaches angered the Selenites. They took him by his neck, his wings flapping, and locked him up in a barnyard, with the ordinary lunar fowls, thus deeply humiliating the Cacklogallinian cabinet minister.

Brunt had remained on good terms with the Selenites and he asked them to help him return to earth. However, by the time he had learnt how to steer through the dangerous regions under his

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own power, the Selenites had relented and the dejected Volatilio had been freed from the henhouse. Brunt and Volatilio descended together. Somehow the Cacklogallian minister had received news from his homeland of a complete rout on the Stock Exchange. A terrible economic depression, caused by the bursting of the Golden Moon Bubble, had developed in Cacklogallinia.

The two unlucky promoters landed on the Blue Mountain in Jamaica where they took leave of each other. Brunt returned to England. Volatilio stripped off his wings and journeyed on, seeking a safe haven where the Imperial wrath of Cacklogallinia could not reach him.

* * *

The Moon as the object of exploitation by big business provided the theme for a story even more outlandish than Brunt's ornithological gold rush. It was written by one of the first communists one and a half centuries after Brunt.

The author of *The Conquest of the Moon*, which appeared in 1888, was more interesting than his narrative. For a few weeks Paschal Grousset (1845-1909) was Foreign Minister of the blood-stained Paris Commune. He was one of the revolutionary leaders responsible for the atrocities which led to the mass execution of hostages, including Archbishop Darboy of Paris. Grousset was a journalist by trade and for a time he edited the revolutionary newspaper *Marseillaise*. After the suppression of the Commune he was banished to New Caledonia whence he escaped, in 1874, to England. Here, under various pen-names he wrote a large number of romances and fictitious travel stories. After the amnesty of 1893 he was allowed to return to France where he re-entered the Chamber of Deputies.

His *Conquest of the Moon* was apparently intended as a satire on French big business during the First Republic. Three vile speculators established a fraudulent company which pretended to build a tunnel to the Moon, a giant steel tube, capable of surmounting

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the problems of atmospheric pressure and gravity. Through this tube a railway was to be laid by which the mineral resources of the Moon, gold, silver and precious stones, were to be brought to earth. The chosen point of departure was Australia and the three crooks, whose real aim was share-pushing, called a meeting of shareholders in Sydney. A French scientist, Norbert Mauny, the hero of Grousset's story, unmasked the scheme at the meeting, but in order to save the money subscribed by investors all over the world, he advanced an alternative plan of his own invention. As it was impossible to build the tunnel he suggested that the Moon should be brought down to earth, within the orbit of the earth's atmosphere.

"Forcing the Moon down would bring the satellite at our mercy," he declared. "We could turn to account all her resources, and, getting hold of her riches, bring them to earth, unless we might choose to establish a lunar colony and settle down permanently there. . . ."

Grousset was yet another writer who must have read Bishop Wilkins's *Propositions*. But he believed there was no way to reach the Moon and he made Mauny declare: "We cannot go to the Moon so we must force her to come to us." It was Swift's *Floating Island* all over again.

Mauny, the three speculators, and an eccentric Englishman, Sir Bucephalus Coghill, formed the board of directors. They decided to place the most powerful magnet ever built on the Peak of Tehbali in the Sudan. They followed the theory of the Italian astronomer, Angelo Secchi, who published a treatise, in 1852, when he was director of the Observatory of the Collegio Romano, on the magnetic powers of the planets which, he said, "act and re-act upon each other as if they were great magnets of immense power."

Grousset did not even attempt to clothe his tale in pseudo-scientific garb. Most of his book consisted of the blood-curdling adventures experienced by the promoters of the Moon venture.

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They fought the desert warriors of the Mahdi in the Sudan and were involved in the Siege of Khartoum.

The giant magnet was erected successfully and duly exerted its immense attraction on the Moon. "It will take her six days, eight hours, twenty-one minutes and forty seconds to come down," declared Mauny. His forecast was correct. The Moon came down on time causing stupendous whirlwinds and covering half Africa in a cloud of dense vapour.

Beyond that, however, no serious damage was found to have been done after the Moon had finally come to rest gently on the sands of the Sahara.

While Earth and Moon still embraced each other, the expedition prepared to climb up the nearest point of the satellite. At this moment the human element intervened. Tyrrell, Sir Bucephalus's stupid servant, pressed the switch which controlled the electro-magnet. The current was disconnected, the attraction ceased suddenly to function and the Moon shot away from the earth back into its orbit, a quarter of a million miles away.

The hapless explorers were sucked into a lunar crater, together with the whole Peak of Tehbali, the observatory, the power house and the living quarters built on it, and all its residents including beautiful Gertrude Kersain and her Arab servant Fatima, who were destined to provide the romantic angle of Grousset's story.

Most fortunately, a liberal supply of air was sucked in too, and everything was soon nicely established and under control on top of the lunar Crater of Rheticus, near the Sea of Vapour. The involuntary visitors found that the Moon was covered with pure gold sand. Excavations produced ruins of magnificent cities, proof of the existence of lunar men who had died out millions of years before there was life on earth. Mummified bodies of these lunar inhabitants, encased in golden tombs thirty feet long, showed that the original natives were giants.

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The explorers quarrelled bitterly among themselves, particularly when oxygen for breathing began to run short. One of them, a most unpleasant dwarf Kaddour—who was none else but the Hunchback of Notre Dame incarnate—planned to murder the three speculators. The presence of the beautiful Gertrude and her dark-eyed maid, also complicated personal relations. All this was more than enough to persuade Mauny that a rapid reunion of earth and Moon was to be desired.

It was only necessary to switch on the current to return the way they had come. But this time Mauny was risking no mistakes. He supervised the operation himself and decided not to berth the Moon hard up alongside the earth but to adjust the current and pause a few miles away. He and his friends then completed the short journey by parachute although there was an awkward moment when the earth and Moon began drifting apart before they had landed.

The dwarf and the three speculators were left on the Moon either to murder each other or perish from natural causes. Mauny and his companions alighted near Khartoum, where orthodox history continued uninfluenced by the yoyo-like behaviour of the Moon, or even a bid by Mauny to rescue General Gordon from the Mahdi's dervishes.

The narrative ended on a subdued note. Not only had the adventurers failed to bring back any gold, but no one would believe their account of the visit to the Moon.



The dream of finding and exploiting an Eldorado on the Moon was never achieved in any of the imaginary expeditions where that was the motive for going there.

In one of the most engaging tales ever written on the subject the motive of greed was eschewed by the author, although he contended that all lunar life was based on metal—not gold but base metal. Such was the idea of the Reverend Miles Wilson, a

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gentle and surprising contributor to the literature of cosmic voyages.

Wilson came from a poor home. Ability and hard work alone won him a modest bursary at Queen's College, Oxford, in 1728. Too poor to continue his studies he took Holy Orders and, after some years of semi-starvation, was appointed curate at Halton Gill, a tiny village in one of the most inaccessible parts of the West Riding of Yorkshire. There he stayed for the next forty years, forgotten by his Bishop and never promoted to a better living.

In great poverty he ministered to his flock and when time allowed escaped through his pen from the bleak Yorkshire moors which circumscribed his life. He wrote two books about travel in the universe. One *The Man in the Moon*, has been completely lost. It was referred to in the second travelogue, *The History of Israel Jobson, the Wandering Jew*, in which Wilson describes Israel's "Travels in the lower World and his Assumption thro' the Starry Regions, conducted by a Guardian Angel, exhibited in a curious Manner the Shapes, Lives and Customs of the Inhabitants of the Moon and Planets".

The hero of the history was in truth Ahasuerus, the Jew who mocked Christ before the crucifixion, and was cursed by Him: "Thou shall walk whilst I will rest."

In Wilson's tale the Wandering Jew was called Israel Jobson, the son of a cordwainer in Sychem, between Mount Gerizim to the south and Ebal to the north. Israel had "acquired tolerable proficiency in writing and arithmetic". At nineteen he was orphaned, married, and "blessed with an issue of hopeful children". He had settled down as a cobbler and were it not for his encounter with the Saviour he might have lived in peace. Instead he was cursed to wander until "the soles of his feet became hard and callous as a stag's horn".

By the time he had wandered through "the wonderful State of the Great Moguls and the Empire of Hindustan" he realized

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that "the Pomp and Pageantry of Terrestrial Monarchs was but little when put in the Balance with the Inhabitants of the Celestial Mansions". However, reflecting the experience of his author, Israel Jobson remained a discriminating traveller. The "Burning Sands of Lybia, the terrors of the frozen Alps" which he was compelled to cross, did not impress him particularly, because "the haggard mountains, dismal caverns and deep vales of the West Riding, the horrid view of the desolation from the summit of Penyghent Hill" were even worse. A touching cry which came not from a man who had seen too much but from one who had seen too little.

Wilson may well have prayed with his hero to be relieved, but only Israel Jobson's plea succeeded: "My prayer was heard, the Mountain was immediately covered with a Cloud of Mist and an ethereal chariot descended with a Messenger." They rode on to the Moon where there was a tremendous "clangor".

The Moon was full of metal and the inhabitants were made of the same material, humble "pot tin or pan metal". Normally, they walked about like toy soldiers, precisely and carefully, because they had to avoid injury at all costs. "If an Hole be made either in the Head or Body, to let out the vital Heat which their Life consists of, they immediately die." However a battle had been fought by some of the tin men just before Israel's arrival and their surgeons "who were skilled coppersmiths, were busy mending the wounds after the battle, hence the hammering".

Soon Israel drew near to a large group of Selenites: "They seem to be made of burnish'd Brass and almost dazzle my eyes." The womenfolk appeared to be even more highly polished than the men: "They are females, who use all the arts to enveigle and ensnare unwary youths, but they only flourish a while for they scour their cipper noses plane with their faces and their bodies so thin, that the vital heat evaporates."

The love life of the Selenites was no simple affair, as Israel soon learned to his utter disgust: "The progeny of the Pan-metal

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people are propagated by mutual embraces, which in the coition become so hot as to melt and dissolve a little of their virile substances. In the space of nine weeks the female produces a Metallick Youth of the same species, either male or female, but sometimes it happens to be what they call a Lunarian, which having rent its parent comes tinkling into the world like a kettle drum."

The kettle-drum children were regarded "as the greatest rarities in the Lunar World, and were constantly sought for by 10,000 men of the neighbouring principalities". The battle had been fought for the possession of one new-born kettle-drum child. Observed the guardian angel: "The Lunar World has its follies as well as your earthly people!"

The male Selenites were long-living creatures. They could "hold out two hundred years, only then wasting away into verdegrase as are all brazen vessels...."

Encouraged by his rather mischievous guardian angel, Israel approached one of the lunar ladies and paid her a "gentle salute", with disastrous results: "The metallick female was so hot that I had not only my beard taken off without a razor, but my hand got all blistered...."

On another occasion Israel observed some naughty boys leaping from rock to rock, breaking an arm or a leg and "providing much work for the coppersmiths". On the other hand, the Selenites had also some agreeable characteristics: "When snoring in their sleep the Metal Folk sound like so many organ pipes and brazen trumpeters."

But Israel was cursed to wander on, and his stay on the Moon was brief.

On he straggled to other planets, some inhabited by strange creatures "all of the neuter gender, that is they are of no sex at all", and met cosmic beings "fixed as trees, to remain there to the End of Time."

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Another account of distant wanderings was written at about the same time as that of Israel Jobson. The author was probably another clergyman, Mr. Ralph Morris, although his identity was never fully established. There the similarity between the two ended.

A Narrative of the Life and Astonishing Adventures of John Daniel—taken from his own Mouth by Mr. Ralph Morris was published in London during 1761. Later editions, which appeared in 1770, 1801, and 1848 did not bear Morris's name. The narrative recorded the life of a smith, born at Royston, Hertfordshire, and it began on an earthy note which was successfully maintained throughout.

Young John Daniel had lost his mother in childhood. His father married again and, soon after, John's youthful stepmother tried to seduce her fourteen-year-old stepson. John, disgusted, left home to seek his fortune in the world outside.

Shipwrecked on a remote island, he discovered that his sole companion, a sailor whom he had known as Thomas, was, in fact, a woman. They staged a solemn marriage ceremony, the bridegroom acting as the priest and ordering "Thomas", who had revealed her true name, Ruth Comin, to repeat the vows. They lived happily together for some years, had several children and resigned themselves to a lifetime on their "Island of Providence".

Twenty years passed and, "after many discourses", John and Ruth decided to "marry" their eldest son and daughter. Although Ruth "had great aversion to so incestuous a union", John pointed out that Adam's son had married a sister. As a result of their wise decision, Mr. and Mrs. Daniel had the pleasure of watching the island's population grow to encompass fifteen grandchildren in addition to their eleven sons and daughters. Only one of the boys, Jacob, remained unmarried, partly because there were no sisters left for him, partly because he was more interested in mechanics than women.

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Eventually it became necessary for Daniel to divide the island into settlements and apportion his herd of cattle. Thus the Daniel tribe might have lived happily ever after, but for the celibate Jacob. Having listened since childhood to his father's tales of England, and the many lands he had visited in his youth, Jacob was determined to leave the island. In great secrecy he constructed an engine, an aircraft, in which he planned to fly to the land of his father.

Jacob Daniel's flying machine was so ingenious it has since found mention in technical books, and J. E. Hodgson described it in his *History of Aeronautics in Great Britain*. Indeed, the Daniel flying machine was a direct ancestor of Mr. Robert Cockerill's R.V.I., the British hovering "saucer" of 1959. Father Daniel described it thus:

'Jacob asked me to go with him to the mountain to see him fly his "Eagle", as he called the machine. We loaded the cart with the parts and brought it up the hill. Jacob first of all struck four poles into the earth at proper distances, measuring them with four bars, in the ends of the two longest of which, on the flat sides, were four holes into which the four points of the upright poles were to enter, at about three feet high from the ground.'

Then letting the ends of the shorter pieces (of which there were several, all tenanted at the ends), into mortices or grooves on the inward edges of the two long pieces, he pinned them in very tight, leaving about a foot space unfilled up near one end, where he contrived a trap door to lift up and shut down at pleasure.

'When the whole woodwork was framed it looked like a stage, upon which he could mount by getting under it and opening the trap-door. In the middle of this floor was a hole about four inches in diameter, to let in a pipe like a pump, to the upper part of which was a handle on each side, and a pendant iron between them, which ran through the pipe beneath the floor. The pipe itself was held firm in the floor by four long irons fastened to its

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body and screwed down to the floor. This was the whole form of the upper structure of the floor or stage.

'Near the extremities of the floor every way, at proper distances, on the under edge were driven in several flat and broad-headed staples, into each of which were thrust and screwed in a thin iron rib, about three inches broad next the floor, and from thence tapering to a point at the length of about three yards. These were all clothed with calico, dipped in wax, each running into a sort of scabbard or sheath made of cloth being screwed to their staples and the floor.

'On the underside of the floor was a circle of round iron, about five feet in diameter, with several upright legs, about a foot long, equal in number to the above described ribs. Between these legs, on the inter-spaces of the round iron ring, just under each rib, hung balances exactly poised upon the ring, with all their ends nearly meeting in the centre, under the pipe hole. Each of these, by an iron chain fixed to it, was linked to the sucker iron of the pipe or pump, and the other end was, with a like chain, linked to an iron loop screwed into the rib. All the clothing was hooked upon little pegs all round the outward edge of the floor, so close as to keep the air from passing. Thus the whole apparatus being fixed, my son opened his trap-door, and ascending through it, mounted the stage, fixed the handle and began to play his wings, to see that all was right.

'I observed that when the pump handle was pressed downwards, as in pumping, it raised the sucker and the pendant iron raised the end of the balances next to it. The other extremities of the balances hooked to the ribs, now descending, drew their corresponding ribs downwards. Each uplifting of the handle gave the ribs liberty, through their springiness, to return to their horizontal position again. Thus they were raised and depressed proportionally to the motion and force of the handle and exactly represented the use and play of wings in birds.'

'The whole machine, now standing at such a height that I

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could look under and over it, appeared of a vast dimension. It was almost of an oval form. Each wing extended at least three yards at the sides from the floor, but at the two ends it was somewhat more. There was a handle on each side of the pump and so Jacob could make it go which way he would, by altering his own standing either on the one side or the other of the pump, for the side he stood on being the heaviest, and the other consequently mounting upwards, it would always move that way which end was the highest.'

In the end old John Daniel "after many entreaties consented to take a turn with him". The trial flight was disastrous. The machine overshot the edge of the mountain and "away we went not knowing whither".

Soon the two aviators lost all sense of time. Their journey to the Moon was quite unintentional, indeed neither father nor son realized what they were approaching.

'Looking about us every way, we saw a vast Moon. The Eagle was wavering about and struck us into a terror.'

At last the flying machine regained stability and hovered steadily near the great luminous continent. The two fliers landed upon "a prodigious high and craggy hill, with vast precipices on each side". Unknowingly, they had come down on the peak of a lunar crater.

As soon as they touched down darkness descended. They fell asleep for "much longer than a night", awoke refreshed and decided to go down from the mountain-top.

'We descended with great resolution, neither seeing nor hearing the least creature or noise, all the way we went; till coming near the level ground, where a monstrous cave gaped to our left hand, we thought we heard shrill voices, and standing still heard

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them plainer, but so shrill, fine and musical, that we doubted them to be human. Having passed a little way on the level, we saw several things pass by us, in various shapes, that we have never before observed; but though some of them seemed to go erect, yet they were very small and thin, and we could not discern their countenances, for their heads seemed to be covered with something. One of them stopped just before us, and by the dim light shone like copper; but seeing us step forward he gave a great shriek and fled, muttering somewhat that we did not understand.

'On the third day the sun rose up above the hills. Its presence gave us such a flow of spirits, that we even forgot our toils and hardships. It gave us from the mountain we afterwards climbed up, a prospect of the most romantic country I had ever beheld: there were prodigious mountains, extensive plains, and immense lakes, interspersed with the vastest plantations of trees that can be imagined, to lie within the compass of the eye at once.'

'We entered the groves of trees, and began to see several people (as we called them) and diverse sorts of cattle, beasts and birds, but far different in make, shape, and action, from what I had ever seen before.'

'The people seemed, as I said, of a bright copper colour all over, and had hair so thick and long, as when it was justly distributed all round their head, it would almost cover their whole body. Some of those we saw, just upon the approach of light, but all that presented after the sun appeared, had their hairs tied up in great knots behind; when their bodies being disengaged from it, they shone like gold.'

'Having seen so many of these people, who only gazed at us, with little round eyes in their small faces, and none of them being armed with what might offend us, we ventured to call to them. But they took no notice by way of reply, and only moved off the faster. Indeed, they were so light and nimble of foot that it would have been a vain pursuit to have followed them. At last,

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turning a corner of some tall bushes one day, and walking pretty fast, one of these men (as I call them) met me, breast to breast.'

The Daniels began questioning the puny Selenite who was terrified by the two strangers until they calmed him with gentle stroking. Conversation proved to be limited, although the Selenite seemed to understand John's and Jacob's requests for food. He pointed to some near-by herbs and made encouraging noises. "His sounds were not articulate, being mostly short and broken aspirates, and very little variety he seemed to have even of them."

When searching for their machine the Daniels "met a multitude of the same people, who treated us in the most humble and friendly manner".

The two aviators stayed for some time with their hosts, helped them to gather the harvest of some strange corn that "produced the lightest of flour, which they mix with water and dry in great quantities in the sun, in lumps of a pound, and when they want it, they give it a stroke with their hand, and it falls into crumbles, which they eat by the handfuls".

Full of pity for the ignorant creatures, John decided, nonetheless, the time had come to leave. With Jacob and a few of the Selcnites he began to climb the mountain. From the peak the visitors had a final look at the strange country. Though able "to see immensely far about, there was no kind of any city or habitation". They found the machine in good order where they had left it and took off, still unaware that they had been on the Moon. Not until they landed on a remote island did they learn from the resident "monsters"—all descendants of a local lady-monster and a shipwrecked Englishman—that they had accomplished a lunar expedition.

After spending some time on that island they flew on to Lapland where a Dutchman, who had visited the Daniel's island in their absence, gave them bad news of the family. Ruth was

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dying of grief and there was dissension and strife in the tribe. From Lapland, father and son walked to Norway where they joined the crew of a whaling ship. Jacob was killed on board in an accident. John Daniel reached England and returned to his home town Royston where he died, without ever having seen the Isle of Providence and his family again.



The early nineteenth century brought two more, though very different, stories about journeys to the Moon, one in the fairy-tale tradition, the other an American prototype of science-fiction.

Thomas Crofton Crocker, the famous collector of Irish folklore, and a friend of the brothers Grimm, related in his *Fairy Legends and Traditions of South Ireland* how a drunken gamekeeper, Daniel O'Rourke, after drinking too much stout, dozed off beneath the walls of the haunted castle of Carrigapooka in County Kerry. When he woke up, O'Rourke was full of remorse for having been drunk on Lady Day. He saw a large eagle perching on the wall, mounted it and off they went in Irish fashion "flying like a lark".

When the talking eagle grew tired of the flight, he suggested a rest on the Moon to O'Rourke. Whereupon the gamekeeper grasped a reaping hook which stuck out of the side of the Moon and heaved himself on to the surface of the planet. Before long he met the Man in the Moon. Later he had many more adventures including a flight to Arabia and a ride through the ocean on a friendly whale. But this enchanting fairy-tale added nothing new to descriptions of flight in space.

Very different was *A Voyage to the Moon, With some accounts of the Manners and Customs, Science and Philosophy of Morosufia and other Lunarians*, published in New York in 1827. Joseph Atterley was the pen-name of an unknown author. This was one of the earliest works which could be described as a science-fiction story

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about a journey in the universe. It was also the first lunar expedition undertaken by an American space traveller.

Atterley, accompanied by a Burmese fakir, travelled to the Moon sealed in a projectile made of copper and loaded with "lunarium", a metal discovered by Atterley on earth, which had some unusual qualities. "This metal, when separated and purified, has a great tendency to fly off from the earth . . . and in the course of our experiments we found that this same metal, which was repelled from the earth, was in the same degree attracted towards the Moon," the author explained.

His machine consisted of a slender tube, very similar in shape to a modern missile: "It had an opening large enough to receive our bodies, which was closed by double sliding panels, with quilted cloth between them. When these were properly adjusted the machine was perfectly air-tight, and strong enough, by means of iron bars running inside and out, to resist the pressure of the atmosphere. On top of the copper chest and on the outside we had as much of the lunarium metal as we found by calculation and experiment would overcome the weight of the machine as well as its contents, and take us to the Moon on the third day."

Provided with condensed air, which they could obtain through an air pump, and being able to watch their progress through a small window made of thick glass, the American and the Burmese took off and arrived safely on the Moon, controlling the landing of their missile by releasing lumps of the "lunarium" from the head of the rocket. But, alas, their report of what they found on the Moon was tedious; the same old story of a landscape comprising high mountains, immense lakes and rivers, and fertile pastures amidst fire-spitting volcanoes. The return journey was easy—a load of lead was attached to the missile's head and back it came to earth, in similar manner.

CHAPTER TEN

Light on the Moon by the "New York Sun"

DURING the summer of 1835, the *New York Sun*, the city's only penny newspaper, was struggling for existence. Its owner, who was losing money, bluntly told the editor that he would close down the paper if the circulation did not increase.

On August 25 the *Sun* printed on the front page the first of a series of reports which achieved the desired result.

The banner headline read:

GREAT ASTRONOMICAL DISCOVERIES
*Lately Made by Sir John Herschel, LL.D., F.R.S., etc. At the Cape
of Good Hope.*

Underneath, the *New York Sun* imparted the startling news that there was life on the Moon.

The paper announced that it had acquired the exclusive rights to reprint full reports of these amazing discoveries, made by Sir John Herschel, the famous English astronomer, in South Africa. The reports would be reprinted from his accounts which appeared as a special supplement to the *Edinburgh Journal of Science*.

It quoted the following introduction to the *Edinburgh* publication:

'In this unusual addition to our Journal, we have the happiness

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of making known to the British Public, and thence to the whole civilized world, recent discoveries in astronomy, which will build an imperishable monument to the age in which we live, and confer upon the present generation of the human race a proud distinction through all future times.'

These were ebullient words to be used in a scientific journal, but the *Sun* was ready with an explanation:

'To render our enthusiasm intelligible we want to state at once that by means of a telescope of great dimensions and a lens with a magnifying and space-penetrating power of 42,000 times, the younger Herschel has already made the most extraordinary discoveries in every planet of our solar system; has discovered planets in other solar systems; has obtained a distinct view of objects on the Moon fully equal to that which the unaided eye commands of terrestrial objects at the distance of a hundred yards; has definitely settled the question whether the satellite is inhabited, and by what orders of being.'

And the *Sun* confided that "for our early and almost exclusive information concerning these facts, we are indebted to the devoted friendship of Dr. Andrew Grant, the pupil of the elder, and for several years past the inseparable coadjutor of the younger Herschel. The amanuensis of the latter at the Cape of Good Hope, and the indefatigable superintendent of his telescope during the whole period of its construction and operation, Dr. Grant has been enabled to supply us with intelligence equal, in general interest at least, to that which Dr. Herschel himself has transmitted to the Royal Society".

The readers of the *New York Sun*, who at the cost of a penny were thus allowed to share the great disclosures made to the Royal Society, were left in no doubt about the high authority upon which the articles were based.

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The paper did not claim explicitly in the first instalment that living beings had been observed on the Moon. It contented itself with a description of craters, mountains, rivers, forests and lush vegetation, all of which were clearly to be seen through Herschel's new giant telescope.

However, the first article did hint that animal life also existed and left readers in a nicely-judged state of anticipation.

Within a few hours every copy had been sold. A crowd surrounded the offices of the *Sun* shouting for more news. The next day the paper obliged, but the emphasis of the second instalment was still restrained and perhaps a little too aesthetic for the taste of a penny journal's readers.

It waxed enthusiastic on the superb view of the Moon which had been revealed by the giant telescope at 9.30 p.m. on January 10, when Sir John Herschel and Dr. Grant at last succeeded in focusing the instrument precisely. They saw: "a mountainous district of highly diversified and romantic character" and, moving their lenses slightly, they perceived "an inland sea, which turned out to be the Sea of Clouds. Fairer shores never angel coasted on a tour of pleasure. A beach of brilliant white sand, girt with wild castellated rocks, apparently of green marble, varied by chasms, occurring every two or three hundred feet, with grotesque blocks of chalk or gypsum, and feathered and festooned with the clustering foliage of unknown trees, moved along the bright wall of our apartment until we were speechless with admiration. The water, whenever we obtained a view of it, was nearly as blue as that of the deep ocean, and broke in large white billows upon the strand".

Then, Herschel and Grant reported, they perceived whole ranges of hills of an unknown mineralogical structure, yet none the less tantalizingly opulent in appearance "glistening as if encrusted with sapphires, rubies and amethysts". There were landscapes framed by "obelisk-shaped or very slender pyramids, standing in irregular groups, each composed of about thirty or

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forty spires, every one of which was perfectly square". These spires were not mere rock: "They were monstrous amethysts, of a diluted claret colour, glowing in the intensest light of the sun. They varied in height from sixty to ninety feet, though we saw several of a still more incredible altitude."

Whereupon the report went into great detail. The telescope with its gargantuan lens weighed 14,826 lbs., and afforded enormous powers of magnification. It apparently enabled Sir John, Dr. Grant and their assistants to recognize flowers "which profusely covered the basaltic rock, festooned with verdant, creeping foliage".

The observers also recognized "the dark red flowers, growing in the sub-lunary cornfields, as giant rose-poppies of the *papaver rhoeas* family". Dr. Grant was in no doubt that he had discovered "the first organic production of nature, in a foreign world, ever revealed to the eyes of man". From this he deducted that "the Moon has an atmosphere constituted similarly to our own, and capable of sustaining organized, and therefore, most probably animal world".

Not until this scene-setting had been completed to its satisfaction did the *New York Sun* indicate rather shyly that there were to be actors in the drama. The next instalments still kept the readers in suspense: "We saw forests of mighty trees resembling oaks, but with broad glossy leaves. These wooded mountains passed, we arrived at a region which filled us with utter astonishment. It was an oval valley, surrounded, except at a narrow opening towards the south, by hills, as red as the purest vermillion, and evidently crystallized, for whenever a precipitous chasm appeared—and these chasms were very frequent and of immense depth—the perpendicular sections presented conglomerated masses of polygon crystals, evenly fitted to each other, and arranged in deep strata, which grew darker in colour as they descended the foundations of the precipices. Innumerable cascades were bursting forth from the breasts of every cliff, and some so

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near their summits, and with such great force, as to form arches many yards in diameter. At the foot of this boundary of hills was a perfect zone of hills, surrounding the whole valley, which was about eighteen or twenty miles wide, at its greatest breadth, and about thirty miles in length. Small collections of trees, of every imaginary kind, were scattered about the whole luxuriant area, and here our magnifiers blest our panting hopes with specimens of conscious existence."

At last came the great disclosure for which the readers were waiting so impatiently—the Moon was inhabited.

"In the shade of the woods, on the south eastern side, we beheld continuous herds of brown quadrupeds, having all the external characteristics of the bison, but more diminutive than any species of the *bos genus* in our natural history."

The story was by now creating a genuine sensation, not only in New York, but throughout the cities of the eastern seaboard of the United States. A professor of mathematics in the University of Virginia travelled from Norfolk to meet the editor of the *Sun* and inspect the original reports from Edinburgh. Scientists from Baltimore, Philadelphia and Boston took the speediest stage-coaches to New York in order to be present when the next reports were published. Day and night the dingy offices of the *Sun* were deluged with inquiries and a large crowd kept vigil outside its doors.

The printing presses ran continuously. Some of the printers collapsed with exhaustion.

The professor from Virginia volunteered a learned statement, which the *Sun* eagerly published with the next instalment of the Moon story. It was an unqualified guarantee: the professor had no doubt whatsoever about the truth of the reports.

At first the other New York newspapers watching the sudden upsurge of the *Sun's* circulation with a jaundiced eye, treated the story with disdain. Soon they were caught up by the excitement of the public. The *New York Times* accepted the reports hesitantly

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in the early days but, with its own circulation slipping, it decided to pay the sincerest of compliments to the lowly *Sun* by reprinting extracts. These were introduced by the *Times* with the following encomium: "The writer of the 'Great Moon Discoveries' displays the most extensive and accurate knowledge of astronomy and the description of Sir John Herschel's recently improved instrument, the principle on which the inestimable improvements are founded, the account of the wonderful discoveries in the Moon, etc., are all probable and plausible, and have an air of intense verisimilitude . . ."

Once the ponderous *New York Times* had embraced the news in this way there was no holding the rest of the American Press. Said the *Daily Advertiser*: "No article, we believe, has appeared for years that will command so general a perusal and publication." Chorused *The New Yorker*: "The promulgation of these discoveries has created a new era in astronomy and science generally. . . ."

Only the organ of the business world, the *Journal of Commerce*, displayed something less than proper enthusiasm for the "new era of science" and, apparently ignoring Bishop Wilkins's prediction two centuries earlier that humanity might "do commerce with the inhabitants of the Moon", it asked for more factual information.

The *Sun* dealt with its few critics in magisterial tones: "Ignorance," it told the *Journal of Commerce*, "is always incredulous to the higher order of scientific discoveries because it cannot possibly comprehend them." So much for Wall Street. The *Journal of Commerce* was quick to learn its proper place. The censure was meekly accepted when the *Sun* produced another professor who testified, in writing, that he himself had seen Sir John Herschel's treatise in the *Edinburgh Journal of Science*.

Down in the street the crowds still milled around the offices of the *Sun*. Upstairs Mr. Moses Y. Beach, the owner of the paper,

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which had shot overnight from the bottom to the top of the circulation list in the United States, was rubbing his hands and congratulating his editor, Richard Adams Locke.

Locke accepted the tributes with modesty and some relief. Only a short time before Mr. Beach had threatened to fire him and look for another editor, or even to extinguish the *Sun*.

Richard Locke was an Englishman, a descendant of the famous philosopher. Born in Somerset, where he narrowly escaped death in childhood from smallpox, he had been up to Oxford and joined groups holding radical and even seditious views. Later, in London, he started a Republican news-sheet. He was soon in trouble with the authorities. Threatened with imprisonment, and having lost the small sum of money he had obtained from his family to launch his journal, he decided to emigrate to North America.

In New York he found a job with the *New York Courier and Enquirer*, a serious sixpenny paper. He was then twenty-eight years old and married. His salary was very small and he augmented his income by free-lancing for the "cheap papers", among them the *Sun*. When his shocked employers discovered that one of their reporters was contributing to a popular penny paper, Locke was fired.

He promptly obtained a staff post on the *Sun*. One of his tasks was to report the murder trial of an impostor known as Matthias the Prophet who had poisoned one of his disciples. Locke provided such lurid descriptions of the crime and trial that for a brief period the circulation figures of the *Sun* went up considerably, and he was appointed editor of the paper.

During this period Locke made friends with Edgar Allan Poe, who greatly admired his talent as a journalist. In a brief biography which Poe wrote several years later, he described Locke as a genius: "His prose style is noticeable for its conciseness, luminousness, completeness. He has that method so generally characteristic

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of genius proper. Everything he writes is a model in its peculiar way . . . Like most men of true imagination, Mr. Locke is a seemingly paradoxical compound of coolness and excitability. He is about five-feet seven inches in height, symmetrically formed; there is an air of distinction about his whole person, the *air noble* of genius. His forehead is truly beautiful in its intellectuality. . . ."

Such, in Poe's eyes was the man who perpetrated one of the boldest hoaxes ever recorded, simply because a stimulus was needed for a cheap and relatively worthless newspaper.

Locke prepared his plot with the utmost care, but his vivid imagination got the better of him when, as a journalist, he sensed the fantastic public response to the articles and, as a writer, he decided to give the readers what they wanted. He committed so many blunders and inaccuracies that any schoolboy should have realized the fraud. But such was, and still is, the gullibility of newspaper readers that many of them refused to accept his confession, even after he had admitted the hoax.

The story was not even Locke's own idea. It was inspired by a series Poe had just written for the *Southern Literary Messenger*, the story of the "Unparalleled Adventure of One Hans Pfaall". Hard pressed by Mr. Moses Beach, Locke decided to transform Poe's fanciful idea into a "news story".

A week before he lobbed his bombshell into the columns of the *Sun*, he inserted a seemingly harmless paragraph. It was an alleged reprint from the *Edinburgh Courant*, the reputable Scottish journal which circulated among the American intelligentsia of Scottish descent. It read: "We have just learned from an eminent publisher in the City of Edinburgh that Sir John Herschel, at the Cape of Good Hope, has made some astronomical discoveries of the most wonderful description by means of his new immense telescope of an entirely new principle."

News of Sir John Herschel's enterprise in South Africa had, in fact, come to New York before and other papers had also published brief stories about the new telescope which he had been

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building since 1824. Sir John was the son of the famous German-born astronomer who worked in Britain and, in 1781, had discovered the planet Uranus and added 2,500 new stars to the 102 then known. He had achieved world fame in his own right.

When Locke decided to use Herschel's name he was confident that scientists as well as the general public would accept the claims of further stellar or lunar discoveries, if cleverly presented and properly corroborated. Hence he did not claim exclusive publication, because it was extremely unlikely that the famous astronomer would have used the *Sun* to communicate his discoveries to the world. Instead, he presented the Moon story as an authorized reprint from the *Edinburgh Journal of Science*, a journal which did not exist.

It was the respected *Edinburgh New Philosophical Journal*, which, some years before, had published a number of Sir John's astronomical treatises. They later appeared in book form under the title *General Catalogue of Nebulae and Clusters of Stars* and had nothing to do with lunar observations.

Locke had no knowledge of astronomy at all and, reluctant to share the secret of his hoax with even a willing scientific helper, he made many elementary mistakes. For instance, he said Herschel had "established that the earth was thirteen times larger than the Moon", while it was a known fact that the volume of the earth was forty-nine times, and the mass eighty-one times that of the Moon. Locke's description of Herschel's telescope was downright stupid. The explanation that its extraordinary powers of magnification were made possible "by transfusion of artificial light through the focal object of vision" was quite meaningless. As his friend Poe later commented mildly: "That the public were misled, even for an instant, merely proves the gross ignorance which is so generally prevalent upon subjects of an astronomical nature. . . ." We must not, however, judge the readers of the

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New York Sun in 1835 too harshly bearing in mind some of the beliefs, in 1960, of Flying Saucer devotees.

What was almost incredible was the ease with which scholars and scientists were misled, particularly as Locke described not only the shapes of the animals which inhabited the Moon but even gave precise descriptions of such details as the colour and shape of the eyes of small birds, gaily fluttering about the Moon greenery. Locke declared that Herschel's telescope could magnify all things upon the Moon 42,000 times. But even so, any object on the Moon seen through such telescopic lenses would still appear to be five and three-quarter miles away. Neither the strange inhabitants nor their abodes could have been seen in any detail at such a distance, let alone eyes of small birds or flowers in the lunar meadows.

Yet the fantastic descriptions were believed and when Mr. Beach decided to reprint the series of articles in the form of a pamphlet, 60,000 copies were sold within a few days in New York alone.

Mr. Locke wrote: "The strange bison-like quadrupeds have one widely distinctive feature, which we afterwards found common to nearly every lunar animal we have discovered; namely a fleshy appendage over the eyes, crossing the whole breadth of the forehead and united to the ears.

"We could most distinctly perceive this hairy veil, which was shaped like the upper front outline of a cap known to the ladies as a Queen Mary of Scots cap, lifted and lowered by the ears. . . ." Locke quoted Sir John and his assistants, in a tender gesture to Edinburgh.

"It immediately occurred to the acute mind of Dr. Herschel," explained Locke, "that this was a providential contrivance to protect the eye of the animals from the great extremes of light and darkness to which all the inhabitants of our side of the Moon are periodically subjected."

It seems extraordinary that Locke did not even know that "our

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side of the Moon," never experiences any darkness at all, as in the absence of the sun it receives strong light from the earth.

Emboldened by the wonderful reception of his initial instalments, Locke mingled with the crowd in front of his office, listening to their talk and discovering what they would like to read next. When he realized that most men and women were anxious for more news of their neighbours in outer space rather than astronomical phenomena, he quickly obliged.

The bison-like quadrupeds, with the hairy eye-shields, were soon followed by herds of "good large sheep which would not have disgraced the farms of Leicestershire or the shambles of Leadenhall Market". The English allusion, which betrayed Locke's nostalgia for the old country, probably meant little to his American readers, but they got the main point.

The Moon sheep were of bluish colour, strongly resembling unicorns, having "a single, long horn, slightly inclined forward from the perpendicular". The female sheep had no horns, but a very long, trailing tail. Locke admitted that "this strange animal would be classed on earth as a monster though in elegance of symmetry it rivalled the antelope, and like him it seemed an agile, sprightly creature running with great speed, and springing from the green turf with all the unaccountable antics of a young lamb or kitten".

The lunar fauna grew with every instalment, which was hardly surprising, considering the paradise-like pastures and woods enjoyed by the Moon animals.

"On examining the centre of this delightful valley, we found a large branching river, abounding with lovely islands, and water-birds of numerous kinds. A species of grey pelican was the most numerous; but a black and white crane with unreasonably long legs and bill, was also quite common."

There were, of course, beasts of the sea, too. But the keen observers could obtain but a glimpse of "a strange amphibious

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creature of a spherical form, which rolled with great velocity across the pebbly beach", because they had to leave this prolific valley unexplored "on account of clouds which were evidently accumulating in the lunar atmosphere". This compelled the astronomers to interrupt their observations for two nights, but Dr. Grant hastened to add that the fact of lunar clouds was "in itself an interesting discovery, for more distant observers had questioned or denied the existence of any humid atmosphere in this planet".

By the 13th of January observations were again possible and the giant telescope revealed more sensational scenes. Already Sir John Herschel, who displayed a surprising, if not quite accurate knowledge of zoology and biology, according to Locke, "had classified not less than thirty-eight species of mammalia and five of oviparia". Among them were "a small kind of reindeer, the elk, the boar, the horned bear, and the biped beaver. The last resembles the beaver of the earth in every other respect than in its destitution of a tail, and its invariable habit of walking upon two feet. It carries its young in its arms like a human being and moves with an easy gliding motion".

The landscape then changed to one of tropical splendour. There were tall lunar palm trees bearing large crimson flowers, fruit like huge tree-melons and "elegant striped quadrupeds, about three feet high, like a miniature zebra", there were birds of brilliant plumage, "golden and blue pheasants" and on the sandy shores the observers easily distinguished "countless multitudes of univalve shell-fish".

With great eloquence Locke described another valley opening into a lake: "Imagination, borne on the wings of poetry could alone gather similes to portray the wild sublimity of this landscape, where dark behemoth crags stood over the brows of lofty precipices, as if a rampart in the sky, and forests seemed suspended in mid-air. On the eastern side there was one soaring crag, crested with trees which hung over in a curve like three-fourths

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of a Gothic arch, and being of crimson colour, its effect was most strange upon minds unaccustomed to the association of such grandeur with such beauty."

Locke later confessed that he wanted to make the friendly beavers, walking on two legs and "living in huts constructed better and higher than those of many tribes of human savages and, from the appearance of smoke in nearly all of them, undoubtedly acquainted with the use of fire", the only intelligent inhabitants of the lunar world.

However, mingling with the crowd besieging his office and listening to their talk, Locke realized his readers were longing for "real" men and women on the Moon. He decided he could not disappoint them.

So, in the final instalments, he revealed that Professor Herschel had, at last, seen lunar men. For this purpose the astronomers had to change the lenses of their telescope: it needed a really powerful glass to discover the Selenites, first a lower order and then the aristocracy of "Vespertilio-Homo", the "Man-bats".

"We were thrilled with astonishment," reported Dr. Grant, "to perceive four successive flocks of large winged creatures, wholly unlike any kind of birds, descend with a slow, even motion from the cliffs on the western side, and alight upon the plain."

"They were first noticed by Dr. Herschel who exclaimed: 'Now, gentlemen, my theories against your proofs, which you have often found a pretty even bet; we have here something worth looking at. I was confident that if ever we found beings in human shape, it would be in this longitude, and that they would be provided by their Creator with some extraordinary powers of locomotion.'"

After this pious remark Sir John ordered that the "full power of his devices be brought to bear", commanding, "Exchange the lens for my number D!"

This lens having been hastily fitted, the observers "counted

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three parties of these creatures, of twelve, nine and fifteen each, walking erect towards a small wood near the base of the western precipices. Certainly they were like human beings, for their wings had now disappeared, and their attitude in walking was both erect and dignified".

Professor Herschel decided that a closer look was essential and "after we introduced lens number H.Z. which brought them to the apparent proximity of eighty yards, the highest clear magnitude we possessed until the end of March, we had a perfectly distinct and deliberate view".

"They averaged four feet in height, were covered, except on the face, with short and glossy copper-coloured hair, and had wings composed of a thin membrane, without hair, lying snugly upon their backs, from the top of the shoulders to the calves of their legs. The face, which was of a yellowish-flesh colour, was a slight improvement upon that of a large orang-outang, being more open and intelligent in its expression, and having a much greater expansion of forehead. The mouth, however, was very prominent, though somewhat relieved by a thick beard on the lower jaw, and by lips more human than any species of the simia genus".

Locke added mischievously that one of Professor Herschel's assistants, Lieutenant Drummond, had commented: "because of the general symmetry of their bodies and limbs they were infinitely superior to apes, so much so that they would look as well on parade ground as some of the old Cockney Militia . . .".

"While passing across the canvas, and whenever we afterwards saw them, these creatures were evidently engaged in conversation and their gesticulations, and more particularly the actions of their hands and arms, appeared impassioned and emphatic".

"We hence inferred they were rational beings, and although not perhaps of so high an order as others which we discovered

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the next month on the shores of the Bay of Rainbows, that were capable of producing works of art and contrivance."

"The next view we obtained of them was still more favourable. It was on the borders of a little lake or expanded stream. Some of these creatures had crossed this water, and were lying like spread eagles on the skirts of the wood. We could then perceive that their wings possessed great expansion, and were similar in construction to those of the bat, being a semi-transparent membrane, expanded in curvilinear divisions by means of straight radii, united at the back by the dorsal integuments. But what astonished us very much was the circumstance of this membrane being continued from the shoulders to the legs, united all the way down, though gradually decreasing in width. The wings seemed completely under the command of volition, for those creatures whom we saw bathing in the water, spread them instantly to their full width, waved them as ducks do theirs to shake off the water, and then as instantly closed them again in a compact form."

Dr. Grant was able to establish that "these creatures were of both sexes", but did not further enlarge upon their anatomic characteristics, loyally stating that he prefers the detailed results of closer observation "first to be laid before the public in Dr. Herschel's own report". One reason for this was that "they will be fully and faithfully stated by Dr. Herschel, however incredulously they may be received". Moreover, there was little more to observe because "the three families suddenly and almost simultaneously spread their wings and were lost in the dark confines of the canvas." Small wonder that the observers "had hardly time to breathe from our paralysing astonishment".

Locke carefully refrained from disclosing anything about his lunar inhabitants that could not be read aloud in the parlour of the most puritanic-minded family. Only in one brief passage was there the slightest deviation from the narrow path: "The man-bats are doubtless innocent and happy creatures, notwithstanding

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some of their amusements would but ill comport with some of the terrestrial notions of decorum."

His readers never learned what these amusements were, but they were given plenty of information about the social life of the Vespertilio-Homo, when on the night of January 14th, lens H.Z. was trained upon the region near the lava-emitting Volcano of Bullialdus, which for some reason was the playground of the Selenites. Professor Herschel realized that the volcano was "a great local convenience to the dwellers in this valley during this long periodical absence of solar light". Indeed, it was a seasonal holiday area, or, according to Dr. Grant, "a place of popular resort for the inhabitants of all the adjacent regions". With the H.Z. lens it was child's play to observe the man-bats' Brighton, Cannes, or Miami: "The very first object in this valley that appeared upon our canvas was a magnificent work of art. It was an equiangular temple built of polished sapphire, or of some resplendent blue stone. The roof was composed of some yellow metal and divided into three compartments. It was a light and airy structure, nearly a hundred feet high from its white glistening floor to its glowing roof, and it stood upon a round green eminence on the eastern side of the valley

"We saw several detached assemblies of beings whom we instantly recognized to be of the same species as our winged friends of the Lake Langrenus. They were chiefly engaged in eating a large yellow fruit like a gourd, sections of which they dexterously divided with their fingers, and ate with rather uncouth voracity, throwing away the rind. . . ." In this the man-bats apparently differed little from earthly holiday-makers making a picnic. "They seemed eminently happy, and even polite, for we saw individuals sitting nearest these piles of fruit, select the largest and brightest specimens, and throw them archwise across the circle to some opposite friend or associate who had extracted the nutriment from those scattered round him. While thus engaged in their rural banquet, or in social converse, they were

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always seated with their knees flat upon the turf, and their feet brought evenly together to form a triangle."

Perhaps remembering Swift, the author added that "for some mysterious reason the figure of a triangle seemed to be an especial favourite among them, for we found that every group or social circle arranged itself in this geometrical shape". They dispersed "at the signal of an individual who stepped into the centre and brought his hands over his head in an acute angle. At this signal each member of the company extended his arms forward so as to form an acute horizontal angle with the extremity of his fingers. But this was not the only proof we had that they were creature of order and subordination".

Unfortunately, the observers never saw the Selenites engaged in any work and the mystery of how they built their magnificent houses and temples remained unsolved. "As far as we could judge," the report said, "the man-bats spent their happy hours in collecting various fruits, in eating, flying, bathing, and loitering about upon the summits of precipices."

As an afterthought, Locke introduced yet more animals in his final instalment, observed in more distant regions of the Moon. They included "at least eight or nine new species of quadrupeds, the most attractive of these being a tall white stag, with lofty spreading antlers, black as ebony". The astronomers saw this creature "trot up to the parties of the semi-human beings, and browse the herbage close beside them, without the least manifestation of fear".

Indeed, the paradise-like peace on the Moon was never disturbed: "The universal state of amity among all classes of lunar creatures, and the apparent absence of carnivorous or ferocious species, gave us the most refined pleasure, and doubly endeared to us this lovely nocturnal companion of our larger, but less favoured world."

With the final instalment, containing the description of the man-bats, the story of the "Great Discoveries on the Moon"

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came to a rather abrupt end. Locke had achieved his purpose—the circulation of the *New York Sun* had soared to undreamed of figures and the paper was now firmly established.

Apparently Locke had prepared material for further instalments, because in the last few paragraphs he mentioned that Sir John Herschel had also observed "in the Valley of Rainbows on Mount Atlas, some superior species of the Vespertilio-Homo, who though of similar stature were of infinitely greater personal beauty and appeared, in our eyes, scarcely less lovely than the general representation of angels by the more imaginative schools of painters. Their social economy seemed to be regulated by laws or ceremonics exactly like those prevailing in the Vale of Triads, but their works of art were more numerous and displayed a proficiency of skill quite incredible to all except actual observers".

By this time either Mr. Moses Y. Beach was becoming a little worried that Locke now intended to concentrate on poetic descriptions at the expense of hard facts, or Locke himself had wearied of the subject. At any rate the series came to a hasty conclusion with the solemn announcement that further detailed accounts would appear in Sir John Herschel's own and authenticated *Natural History of the Moon*, which he was to submit to the Royal Society in London.

It was Locke himself who finally admitted the hoax, to, of all people, a reporter on the hostile *Journal of Commerce*. Some weeks after the publication of the "Discoveries", Locke was stopped in the tap-room of the Washington Hotel in New York by this reporter who had been sent to ask Locke for permission to reprint excerpts from the story. At last, even the *Journal of Commerce* had decided to acquaint its weighty readership with the great discoveries made by Professor Herschel. Locke, in his cups, roared with laughter at this capitulation by his critics and he told the emissary from the *Journal*: "Don't print this stuff, I wrote it all myself, not one word of it is true!" The shaken journalist

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hastened back to his office and informed his editor. The *Journal* took sweet revenge, denouncing Locke in scathing terms as an irresponsible sensation-monger and fraudulent hoaxter.

Locke had the grace to take it in good humour. He published an admission of the hoax in the *Sun*, though not without a hypocritical attempt at justifying his behaviour: "I wrote the story of the pretended discoveries in the Moon solely and expressly to satirize the unwarranted and extravagant exaggerations upon this subject that had been first excited by a prurient coterie of German astronomers, and thence aggravated almost to the point of lunacy itself, both in this country and in England, by the religio-scientist rhapsodies of Dr. Dick."

It was an impudent disclaimer, particularly as Locke was by then preparing his next hoax, the apocryphal diaries of Mungo Park. It was true that Dr. Thomas Dick, a Dundee clergyman, had published a somewhat dubious book, entitled *Celestial Scenery*, in which he presented a random concoction of romance, mysticism and astronomy. About the possible inhabitation of the planets, Dr. Dick wrote: "It appears most probable that the Moon is surrounded with a fluid which serves the purpose of an atmosphere, although this atmosphere, as to its nature, composition and refractive power, may be very different from the atmosphere which surrounds the earth. It forms no proof that the Moon, or any of the planets, is destitute of an atmosphere, because its constitution, its density and its power of refracting the rays of light are different from ours. In our reasonings on this subject we too frequently proceed on the false principle that everything connected with other worlds might bear a resemblance to those on earth." He thought there was life on the Moon, though of very different nature than on earth, and that there were intelligent lunar beings with whom we should be able to communicate. To this end he suggested erecting huge signs of mystical shapes built of stone blocks in the Siberian tundra. However fantastic Dr.

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Dick's ideas might have been, Locke's righteous indignation was unwarranted.

Locke was generously rewarded by his employer, Mr. Moses Beach, for the Moon story, which established the prosperity of the *New York Sun*, and he made a lot of money out of the royalties and translation rights of the pamphlet. He had already found his next "scoop", in a sequel to Mungo Park's *Travels in the Interior of Africa*. Between 1793 and 1806 Park, the famous Scottish explorer, had undertaken several perilous expeditions into "darkest Africa", had discovered the sources of the river Niger, and had published reports of exciting adventures with slave-traders, finally meeting his death in a drowning accident when a guest of King Sokoto of the Bussa cannibals. Because of the Napoleonic wars, the news of Park's death did not reach Europe for a considerable time and it was believed that he was held prisoner by the cannibals, or had met a terrible end at the hands of the witch-doctors. Like Livingstone, half a century later, he became an almost legendary figure, and Locke decided to take advantage of this. Purporting that he had acquired Park's "secret diaries", Locke wrote a series of thrilling stories, which he intended publishing in the *Sun*.

Strangely enough, his admission of the Moon fraud only enhanced his reputation as a brilliant journalist and writer, and a group of wealthy businessmen were ready to finance a new daily paper under his editorship. He left Mr. Beach and the *Sun* and founded the first popular tabloid in New York, which he named *The New Era*. It was in this paper that Locke published the forged Mungo Park diaries, which he later followed with another sensational series of articles on magnetism as "the driving power of the Universe", which he wrote in collaboration, with "the celebrated practitioner in magnetic remedies", Dr. Sherwood a notorious charlatan. Locke remained a successful editor, wielded considerable political influence upon Congress and amassed a fortune, even though *The New Era* did not last very long.

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His pamphlet on the Moon discoveries was selling for several years all over the world and was translated into every living language, even into Welsh. As his friend Poe said many years later in his brief biography of Locke "The worth of anything is just as much as it will bring".

Professor Herschel, in his remote observatory many miles from Cape Town, only learned of Locke's hoax some months after its publication. The news was brought to him by an American zoo and circus owner, Caleb Weeks, who had come to South Africa to collect wild animals. Weeks showed Sir John one of the pamphlets and cuttings from the *Sun*. A less generous man than Sir John might have been incensed and decided upon prosecuting the hoaxter. But Sir John was highly amused and after reading the pamphlet exclaimed: "This is one of the funniest stories I have ever read. Surely, no person in his senses could have taken a word of it seriously!" But Caleb Weeks assured him that millions of credulous people believed the Moon story to be true.

CHAPTER ELEVEN

An Unparalleled Adventure

THE suffering and loneliness of a man soaring through space was described by one of the world's most accomplished explorers of the terrifying and mysterious byways of human experience—Edgar Allan Poe.

His *Unparalleled Adventure of One Hans Pfaall* was a minor literary work by Poe's standards. Nevertheless its publication in the *Southern Literary Messenger* in 1835, which inspired Lock's ambitious hoax, thrust Poe into the centre of the *New York Sun* scandal.

When Locke was discredited, Poe did not desert his friend, but he felt obliged to publish a disclaimer of any connection with the reports of the *Sun*. He also took the opportunity of making some mild comments on Locke's ignorance of basic astronomic facts.

"There is little similarity between my sketchy trifle," wrote Poe "and the celebrated 'Moon Story' of Mr. Locke; but as both have the character of hoaxes—although, the one is in a tone of banter, the other of downright earnest—and as both hoaxes are on the same subject, the Moon, and moreover as both attempt to give plausibility by scientific detail, the author of 'Hans Pfaall' thinks it necessary to say, in self defence, that his own *jeu d'esprit* was published in the *Southern Literary Messenger* about three weeks before the commencement of Mr. L's in the *New York Sun*. Fancying a likeness which, perhaps, does not exist,

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some of the New York papers copied ‘Hans Pfaall’ and collated it with the ‘Moon Hoax’, by way of detecting the writer of the one in the writer of the other.”

“It may here afford some little amusement to show, why no one should have been deceived. However rich the imagination displayed in this ingenious fiction, it wanted much of the force which might have been given it by a more scrupulous attention to facts and to general analogy,” he added.

About his own Moon story, Poe rightly claimed that he had made “an attempt at verisimilitude, in the application of scientific principles so far as the whimsical nature of the subject would permit—to the actual passage between the Earth and the Moon”. Indeed, his description of the agony which his imaginary traveller suffered, stands out as a spine-chilling prophecy of the ordeal the “astronauts” of the rocket age will endure on their real flights into space.

When he devised his tale of a Moon voyage, Poe was only twenty-three. He had read some of the classics of cosmic journeys, though he considered Cyrano’s stories as “utterly meaningless”, and Bishop Godwin’s tale, which he had read in French and believed to have been written by a French author, “though not without some claim to attention, a naïve specimen of the astronomical notions of that time.” He complained that in these and other books of imaginary journeys to the Moon, “there was no effort at plausibility in the details of the voyage itself” and that the writers “seem to be utterly uninformed in respect to astronomy”, overlooking the fact that when these stories were written, astronomy was in its infancy.

Hans Pfaall, the hero of Poe’s balloon flight, was an impudent but inventive bellow-mender in Rotterdam, who was being hard pressed by his creditors. He decided to escape from them to the Moon, and at the same time to take revenge on his persecutors.

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He constructed a balloon, which he filled with a gas of his own invention, "a constitute of azote, with a density about 37·4 times less than that of hydrogen." By night, in a deserted suburb of Rotterdam, Pfaall placed gunpowder charges under the casks containing the secret gas, attached fuses to them and entered the balloon car. Three of his villainous creditors, whom he promised to pay in full if he could "bring the present business to a termination", helped him to take off. They did not know his intended destination, and paid for their gullibility with their lives when the gunpowder exploded.

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'In about four hours and a half I found the balloon sufficiently inflated. I attached the car, therefore, and put all my implements in it: a telescope; a barometer with some important modifications; a thermometer; an electrometer; a compass; a magnetic needle, a seconds watch; a bell; a speaking-trumpet, etc., etc., etc.; also a globe of glass, exhausted of air, and carefully closed with a stopper, not forgetting the condensing apparatus, some unslaked lime, a stick of sealing-wax, a copious supply of water, and a large quantity of provisions, such as pemmican, in which much nutriment is contained in comparatively little bulk. I also secured in the car a pair of pigeons and a cat.

'It was now nearly daybreak, and I thought it high time to take my departure. Dropping a lighted cigar to the ground, as if by accident, I took the opportunity, in stooping to pick it up, of igniting privately the piece of slow-match, the end of which, as I said before, protruded a little beyond the lower rim of one of the smaller casks. This manoeuvre was totally unperceived on the part of the three duns; and jumping into the car, I immediately cut the single cord which held me to earth, and was pleased to find that I shot upward with inconceivable rapidity, carrying with all ease one hundred and seventy-five pounds of leaden ballast, and able to have carried up as many more. As I left the

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earth, the barometer stood at thirty inches, and the centigrade thermometer at 19°.

'Scarcely, however, had I attained the height of fifty yards, when, roaring and rumbling up after me in the most tumultuous and terrible manner, came so dence a hurricane of fire, and gravel, and burning wood, and blazing metal, and mangled limbs, that my very heart sunk within me, and I fell down in the bottom of the car, trembling with terror. Indeed, I now perceived that I had entirely overdone the business, and that the main consequences of the shock were yet to be experienced.

'Accordingly, in less than a second, I fclt all the blood in my body rushing to my temples, and immediately thereupon a concussion, which I shall never forget, burst abruptly, through the night, and seemed to rip the very firmament asunder. When I afterward had time for reflection, I did not fail to attribute the extreme violence of the explosion, as regarded myself, to its proper cause—my situation directly above it, and in the line of its greatest power.

'But at the time I thought only of preserving my life. The balloon at first collapsed, then furiously expanded, then whirled round and round with sickening velocity, and finally, reeling and staggering like a drunken man, hurled me over the rim of the car, and left me dangling, at a terrific height, with my head downward, and my face outward, by a piece of slender cord about three feet in length, which hung accidentally through a crevice near the bottom of the wickerwork, and in which, as I fell, my left foot became most providentially entangled. It is impossible, utterly impossible, to form any adequate idea of the horror of my situation. I gasped convulsively for breath; a shudder resembling a fit of the ague agitated every nerve and muscle in my frame; I felt my eyes starting from their sockets; a horrible nausea overwhelmed me; and at length I lost all consciousness in a swoon.

'How long I remained in this state it is impossible to say. It must, however, have been no inconsiderable time, for when I

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partially recovered the sense of existence, I found the day breaking, the balloon at a prodigious height over a wilderness of ocean, and not a trace of land to be discovered far and wide within the limits of the vast horizon. My sensations, however, upon thus recovering were by no means so replete with agony as might have been anticipated. Indeed, there was much of madness in the calm survey which I began to take of my situation. I drew up to my eyes each of my hands, one after the other, and wondered what occurrence could have given rise to the swelling of the veins, and the horrible blackness of the finger-nails. I afterward carefully examined my head, shaking it repeatedly, and feeling it with minute attention, until I succeeded in satisfying myself that it was not, as I had more than half suspected, larger than my balloon.

'It was not until some time afterward that I recovered myself sufficiently to attend to the ordinary cares of the balloon. I then, however, examined it with attention, and found it, to my great relief, uninjured. My implements were all safe, and fortunately, I had lost neither ballast nor provisions. Indeed, I had so well secured them in their places that such an accident was entirely out of the question. Looking at my watch, I found it six o'clock. I was still rapidly ascending, and the barometer gave a present altitude of three and three-quarter miles. Immediately beneath me, in the ocean, lay a small black object, slightly oblong in shape, seemingly about the size of a domino, and in every respect bearing a great resemblance to one of those toys. Bringing my telescope to bear upon it, I plainly discerned it to be a British ninety-four-gun ship, close-hauled, and pitching heavily in the sea with her head to the W.S.W. Besides this ship, I saw nothing but the ocean and the sky, and the sun, which had long arisen.'



'The Moon's actual distance from the earth was the first thing

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to be attended to. Now, the mean or average interval between the centres of the two planets is 59.9643 of the earth's equatorial radii, or only about 237,000 miles. I say the mean or average interval; but it must be borne in mind that the form of the Moon's orbit, being an ellipse of eccentricity amounting to no less than 0.05484 of the major semi-axis of the ellipse itself, and the earth's centre being situated in its focus, if I could, in any manner, contrive to meet the Moon in its perigee, the above-mentioned distance would be materially diminished. But, to say nothing at present of this possibility, it was very certain that, at all events, from the 237,000 miles I would have to deduct, the radius of the earth, say 4,000, and the radius of the Moon, say 1,080, in all 5,080, leaving an actual interval to be traversed, under average circumstances, of 231,920 miles. Now this, I reflected, was no very extraordinary distance. Travelling on the land has been repeatedly accomplished at the rate of sixty miles per hour; and indeed a much greater speed may be anticipated. But even at this velocity, it would take me no more than 161 days to reach the surface of the Moon. There were, however, many particulars inducing me to believe that my average rate of travelling might possibly very much exceed that of sixty miles per hour, and, as these considerations did not fail to make a deep impression upon my mind, I will mention them more fully hereafter.

'The next point to be regarded was one of far greater importance. From indications afforded by the barometer, we find that, in ascensions from the surface of the earth we have, at the height of 1,000 feet, left below us about one thirtieth of the entire mass of atmospheric air; that at 10,600 we have ascended through nearly one third; and at 18,000, which is not far from the elevation of Cotopaxi, we have surmounted one half the material, or at all events, one half the ponderable body of air incumbent upon our globe. It is also calculated that at an altitude not exceeding the hundredth part of the earth's diameter, that is, not exceeding eighty miles, the rarefaction would be so excessive that animal life

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could in no manner be sustained, and, moreover, that the most delicate means we possess of ascertaining the presence of the atmosphere would be inadequate to assure us of its existence. But I did not fail to perceive that these latter calculations are founded altogether on our experimental knowledge of the properties of air, and the mechanical laws regulating its dilation and compression, in what may be called, comparatively speaking, the immediate vicinity of the earth itself; and, at the same time, it is taken for granted that animal life is, and must be essentially incapable of modification at any given unattainable distance from the surface. The greatest height ever reached by man was that of 25,000 feet, attained in the aeronautic expedition of Messieurs Gay-Lussac and Biot. This is a moderate altitude, even when compared with the eighty miles in question; and I could not help thinking that the subject admitted room for doubt and great latitude for speculation.

'But, in point of fact, an ascension being made to any given altitude, the ponderable quantity of air surmounted in any farther ascension is by no means in proportion to the additional height ascended (as may be plainly seen from what has been stated before) but in a ratio constantly decreasing. It is therefore evident that, ascend as high as we may, we cannot, literally speaking, arrive at a limit beyond which no atmosphere is to be found. It must exist, I argued; although it may exist in a state of infinite rarefaction.'

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'I was now rising rapidly, and by seven o'clock the barometer indicated an altitude of no less than nine miles and a half. I began to find great difficulty in drawing my breath. My head, too, was excessively painful; and, having felt for some time a moisture about my checks, I at length discovered it to be blood, which was oozing quite fast from the drums of my ears. My eyes, also, gave me great uneasiness. Upon passing the hand over them

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they seemed to have protruded from their sockets in no inconsiderable degree; and all objects in the car, and even the balloon itself, appeared distorted to my vision.

'These symptoms were more than I had expected, and occasioned me some alarm. At this juncture, very imprudently, and without consideration, I threw out from the car three five-pound pieces of ballast. The accelerated rate of ascent thus obtained carried me too rapidly, and with sufficient gradation, into a highly rarefied stratum of the atmosphere, and the result had nearly proved fatal to my expedition and to myself. I was suddenly seized with a spasm which lasted for more than five minutes, and even when this, in a measure, ceased, I could catch my breath only at long intervals and in a gasping manner, bleeding all the while copiously at the nose and ears, and even slightly at the eyes. The pigeons appeared distressed in the extreme and struggled to escape; while the cat mewed pitifully, and with her tongue hanging out of her mouth, staggered to and fro in the car as if under the influence of poison. I now too late discovered the great rashness of which I had been guilty in discharging the ballast, and my agitation was excessive. I anticipated nothing less than death, and death in a few minutes.'

'I lay down in the bottom of the car and endeavoured to collect my faculties. In this I so far succeeded as to determine upon the experiment of losing blood. Having no lancet, however, I was constrained to perform the operation in the best manner I was able, and finally succeeded in opening a vein in my left arm with the blade of my penknife.'

'The blood had hardly commenced flowing when I experienced a sensible relief, and by the time I had lost about half a moderate basinful, most of the worst symptoms had abandoned me entirely. I nevertheless did not think it expedient to attempt getting on my feet immediately; but, having tied up my arm as well as I could, I lay still for about quarter of an hour. At the end of this time I arose and found myself free from absolute pain of any

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kind than I had been during the last hour and a quarter of my ascension. The difficulty of breathing, however, was diminished in a very slight degree, and I found that it would soon be positively necessary to make use of my condenser.'

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'The view of the earth, at this period of my ascension, was beautiful indeed. To the westward, the northward, and the southward, as far as I could see, lay a boundless sheet of apparently unruffled ocean, which every moment gained a deeper and deeper tint of blue. At a vast distance to the eastward, although perfectly discernible, extended the islands of Great Britain, the entire Atlantic coasts of France and Spain, with a small portion of the northern part of the continent of Africa. Of individual edifices not a trace could be discovered, and the proudest cities of mankind had utterly faded away from the face of the earth.

'At twenty minutes before nine o'clock, that is to say, a short time prior to my closing up the mouth of the chamber, the mercury attained its limit, or ran down, in the barometer, which, as I mentioned before, was one of an extended construction. It then indicated an altitude on my part of 132,000 feet, or five-and-twenty miles, and I consequently surveyed at that time an extent of the earth's area amounting to no less than the three-hundred-and-twentieth part of its entire surface. At nine o'clock I had again lost sight of land to the eastward, but not before I became aware that the balloon was drifting rapidly to the N.N.W. The ocean beneath me still retained its apparent concavity, although my view was often interrupted by the masses of cloud which floated to and fro.'

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'April 3rd. I found the balloon at an immense height indeed, and the earth's convexity had now become strikingly manifest.

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Below me in the ocean lay a cluster of black specks, which undoubtedly were islands. Overhead, the sky was of a jetty black, and the stars were brilliantly visible; indeed, they had been so constantly since the first day of ascent. Far away to the northward I perceived a thin, white, and exceedingly brilliant line, or streak, on the edge of the horizon, and I had no hesitation in supposing it to be the southern disk of the ices of the polar sea.

April 8th. Found a sensible diminution in the earth's apparent diameter, besides a material alteration in its general colour and appearance. The whole visible area partook in different degrees of a tint of pale yellow, and in some portions had acquired a brilliancy even painful to the eye. My view downward was also considerably impeded by the dense atmosphere in the vicinity of the surface being loaded with clouds, between whose masses I could only now and then obtain a glimpse of the earth itself.

April 14th. Extremely rapid decrease in the diameter of the earth. Today I became strongly impressed with the idea that the balloon was now actually running up the line of apsides to the point of perigee—in other words, holding the direct course which would bring it immediately to the Moon in that part of its orbit the nearest to the earth. The Moon itself was directly overhead and consequently hidden from my view. Great and long-continued labour necessary for the condensation of the atmosphere.

April 16th. Today, looking upward as well as I could, through each of the side windows alternately, I beheld, to my great delight, a very small portion of the Moon's disk protruding, as it were, on all sides beyond the huge circumference of the balloon. My agitation was extreme; for I had now little doubt of soon reaching the end of my perilous voyage. Indeed, the labour now required by the condenser had increased to a most oppressive degree, and allowed me scarcely any respite from exertion. Sleep was a

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matter nearly out of the question. I became quite ill, and my frame trembled with exhaustion. It was impossible that human nature could endure this state of intense suffering much longer. During the now brief interval of darkness a meteoric stone again passed in my vicinity, and the frequency of these phenomena began to occasion me much apprehension.

'April 17th. This morning proved an epoch in my voyage. It will be remembered that, on the thirteenth, the earth subtended an angular breadth of twenty-five degrees. On the fourteenth this had greatly diminished; on the fifteenth a still more remarkable decrease was observable; and, on retiring for the night of the sixteenth, I had noticed an angle of no more than about seven degrees and fifteen minutes. What, therefore, must have been my amazement, on awakening from a brief and disturbed slumber on the morning of this day, the seventeenth, at finding the surface beneath ... suddenly and wonderfully augmented in volume as to subtend no less than thirty-nine degrees in apparent angular diameter!

'I was thunderstruck! No words can give any adequate idea of the extreme, the absolute horror and astonishment with which I was seized, possessed, and altogether overwhelmed.

'My knees tottered beneath me, my teeth chattered, my hair started upon end.

'The balloon, then, had actually burst!' These were the first tumultuous ideas that hurried through my mind; the balloon had positively burst!—I was falling, falling with the most impetuous, the most unparalleled velocity!

'To judge by the immense distance already so quickly passed over, it could not be more than ten minutes, at the farthest, before I should reach the surface of the earth and be hurled into annihilation!'

'But at length reflection came to my relief. I paused; I considered; and I began to doubt. The matter was impossible. I could not in any reason have so rapidly come down. Besides,

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although, I was evidently approaching the surface below me, it was with a speed by no means commensurate with the velocity I had at first conceived. This consideration served to calm the perturbation of my mind, and I finally succeeded in regarding the phenomenon in its proper point of view.

'In fact, amazement must have fairly deprived me of my senses when I could not see the vast difference in appearance between the surface below me and the surface of my mother earth.

'The latter was indeed over my head and completely hidden by the balloon, while the Moon—the Moon itself in all its glory—lay beneath me and at my feet.

'The stupor and surprise produced in my mind by this extraordinary change in the posture of affairs was, perhaps, after all, that part of the adventure least susceptible of explanation. For the *boulevertement* in itself was not only natural and inevitable, but had been long actually anticipated as a circumstance to be expected whenever I should arrive at that exact point of my voyage where the attraction of the planet should be superseded by the attraction of the satellite, or, more precisely, where the gravitation of the balloon towards the earth should be less powerful than its gravitation towards the Moon.

'To be sure, I arose from a sound slumber, with all my senses in confusion, to the contemplation of a very startling phenomenon, and one which, although expected, was not expected at the moment. The revolution itself must, of course, have taken place in an easy and gradual manner, and it is by no means clear that, had I even been awake at the time of the occurrence, I should have been made aware of it by any internal evidence of an inversion—that is to say, by any inconvenience or disarrangement, either about my person or about my apparatus.

'It is almost needless to say that, upon coming to a due sense of my situation, and emerging from the terror which had absorbed every faculty of my soul, my attention was, in the first place,

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wholly directed to the contemplation of the general physical appearance of the Moon.

'It lay beneath me like a chart, and, although I judged it to be still at no inconsiderable distance, the indentures of its surface were defined to my vision with a most striking and altogether unaccountable distinctness.

'The entire absence of ocean or sea, and indeed of any lake or river, or body of water whatsoever, struck me, at first glance, as the most extraordinary feature in its geological condition. Yet, strange to say, I beheld vast level regions of a character decidedly alluvial, although by far the greater portion of the hemisphere in sight was covered with innumerable volcanic mountains, conical in shape, and having more the appearance of artificial than of natural protuberances.

'The highest among them does not exceed three and three-quarter miles in perpendicular elevation; but a map of the volcanic districts of the Campi Phlegraei would afford to your Excellencies a better idea of their general surface than any unworthy description I might think proper to attempt. The greater part of them were in a state of evident eruption, and gave me fearfully to understand their fury and their power by the repeated thunders of the miscalled meteoric stones, which now rushed upward by the balloon with a frequency more and more appalling.

'*April 18th.* Today I found an enormous increase in the Moon's apparent bulk, and the evidently accelerated velocity of my descent began to fill me with alarm.

'*April 19th.* This morning, to my great joy, about nine o'clock, the surface of the Moon being frightfully near and my apprehensions excited to the utmost, the pump of my condenser at length gave evident tokens of an alteration in the atmosphere.

'By ten, I had reason to believe its density considerably increased.

'By eleven, very little labour was necessary at the apparatus;

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and at twelve o'clock, with some hesitation, I ventured to unscrew the tourniquet, when, finding no inconvenience from having done so, I finally threw open the gum-elastic chamber and unrigged it from around the car.

'As might have been expected, spasms and violent headache were the immediate consequences of an experiment so precipitate and full of danger. But these and other difficulties attending respiration, as they were by no means so great as to put me in peril of my life, I determined to endure as I best could, in consideration of my leaving them behind me momentarily in my approach to the denser strata near the moon.

'This approach, however, was still impetuous in the extreme; and it soon became alarmingly certain that, although I had probably not been deceived in the expectation of an atmosphere dense in proportion to the mass of the satellite, still I had been wrong in supposing this density, even at the surface, at all adequate to the support of the great weight contained in the car of my balloon.

'That it was not the case, however, my precipitous downfall gave testimony enough; why it was not so, can only be explained by a reference to those possible geological disturbances to which I have formerly alluded.

'At all events I was now close upon the planet, and coming down with the most terrible impetuosity. I lost not a moment, accordingly, in throwing overboard first my ballast, then my water-kegs, then my condensing apparatus and gum-elastic chamber, and finally every article within the car. But it was all to no purpose.

'I still fell with horrible rapidity, and was now not more than half a mile from the surface. As a last resource, therefore, having got rid of my coat, hat and boots, I cut loose from the balloon the car itself, which was of no inconsiderable weight, and thus, clinging with both hands to the network, I had barely time to observe the whole country, as far as the eye could reach, was

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thickly interspersed with diminutive habitations, ere I tumbled headlong into the very heart of a fantastical-looking city, and into the middle of a vast crowd of ugly little people, who none of them uttered a single syllable or gave themselves the least trouble to render me assistance, but stood, like a parcel of idiots, grinning in a ludicrous manner, and eying me and my balloon askant, with their arms set akimbo.

'I turned from them in contempt, and gazing upward at the earth so lately left, and left perhaps forever, beheld it like a huge, dull, copper shield, about two degrees in diameter, fixed immovably in the heavens overhead, and tipped on one of its edges with a crescent border of the most brilliant gold.

'No traces of land or water could be discovered, and the whole was clouded with variable spots and belted with tropical and equatorial zones.

'Thus, after a series of great anxieties, unheard-of dangers, and unparalleled escapes, I had at length, on the nineteenth day of my departure from Rotterdam, arrived in safety at the conclusion of a voyage undoubtedly the most extraordinary and the most momentous ever accomplished, undertaken, or conceived by any denizen of earth.

'But my adventures yet remain to be related. And indeed after a residence of five years upon a planet not only deeply interesting in its own peculiar character, but rendered doubly so by its intimate connection, in capacity of satellite, with the world inhabited by man, I may have intelligence for the private ear of the States' College of Astronomers of far more importance than the details, however wonderful, of the mere voyage which so happily concluded. This is, in fact, the case. I have much—very much which it would give me the greatest pleasure to communicate.

'I have much to say of the climate of the planet; of its wonderful alternations of heat and cold; of unmitigated and burning sunshine for one fortnight, and more than polar frigidity for the

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next; of a constant transfer of moisture, by distillation like that in *vacuo*, from the point beneath the sun to the point the farthest from it; of a variable zone of running water; of the people themselves; of their manners, customs, and political institutions; of their peculiar physical construction; of their ugliness; of their want of ears, these useless appendages in an atmosphere so peculiarly modified; of their consequent ignorance of the use and properties of speech; of their substitute for speech in a singular method of inter-communication; of the incomprehensible connection between each particular individual in the Moon with some particular individual on the earth—a connection analogous with, and depending upon, that of the orbs of the planet, and the satellite, and by means of which the lives and destinies of the inhabitants of the one are interwoven with the lives and destinies of the inhabitants of the other; and above all, of those dark and hideous mysteries which lie in the outer regions of the Moon—regions which, owing to the almost miraculous accordance of the satellite's rotation on its own axis with its sidereal revolution about the earth, have never yet been turned, and by God's mercy, never shall be turned, to the scrutiny of the telescopes of man.'

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Hans Pfaall spent five years on the Moon, but Poe did not elaborate on his experience. However, an account of the journey reached the magistrates of Rotterdam by a special lunar messenger. In his letter Pfaall promised to disclose all he had seen and learned on the Moon to the States' College of Astronomers, in exchange for a free pardon for the murder of his three creditors at the time of his departure.

Reflecting his contempt for the terrestrial Press, Poe decided to let Pfaall's lunar messenger descend to earth in a balloon "manufactured entirely of dirty newspapers". The description of the lunar messenger is the only information which Poe imparted about "the shape, nature and customs" of Hans Pfaall's hosts on the Moon. Poe's Selenite was a tiny, fat dwarf, hardly

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two feet tall, with a body "more than proportionally broad, giving to his entire figure a rotundity highly absurd". His nose was "prodigiously long, crooked and inflammatory"; his eyes were "full, brilliant and acute"; his chin and cheeks "although wrinkled with age, were broad, puffy and double, but of ears of any kind there was not a semblance to be discovered upon any portion of his head".

Perhaps he could not hear the great hubbub which came from "the vast crowd of people assembled in the great square of the Exchange in the well-conditioned city of Rotterdam", watching with excitement the descent of the lunar balloon. At any rate, he did not care, and having descended to about one hundred feet, he threw out the letter and discharged a portion of his ballast. The balloon then "arose like a lark and, soaring far away above the city, at length drifted quietly behind a cloud similar to that from which it had so oddly emerged, and was thus lost for ever to the wondering eyes of the good citizens of Rotterdam".

Thus the fate of Hans Pfaall on the Moon was left in doubt. Poe ended his story on a bitingly satirical note. Some gossips in Rotterdam had it that "the drunken villain and the three very idle gentlemen styled his creditors—presumed dead—were all seen no longer than two or three days ago, in a tippling house in the suburbs, having just returned, with money in their pockets from a trip beyond the sea". These doubters suggested that Pfaall's lunar messenger was none other than "an odd little dwarf and bottle conjurer, both of whose ears, for some misdeemeanour, have been cut off close to his head", and who has been missing for several days from the neighbouring city of Bruges. Furthermore "the newspapers which were stuck all over the little balloon were newspapers of Holland, and therefore, could not have been made in the Moon. They were dirty papers—very dirty—and Gluck, the printer would take his Bible oath to their having been printed in Rotterdam".

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Faced with such evidence, the general opinion was that "the College of Astronomers in the city of Rotterdam, as well as all other colleges in all other parts of the world, not to mention colleges and astronomers in general, are, to say the least of the matter, not a whit better, nor greater, nor wiser than they ought to be".

CHAPTER TWELVE

By Rocket to the Moon

'STEEL-LIDDED eyes of four goggling periscopes projecting from a concrete hump were the only surface signs of the intense activity below as I slid into the blockhouse hunched near Canaveral beach like a monstrous petrified turtle.'

'I climbed, through the 25-ton blast-proof door, down the iron stairway to the control centre of launching pad No. 19. There was a preview of how missile men will work when the rockets are installed in their deep-down launching pits. More than a score of experts were working at the control desk. The object of their attention: a 90 feet-high Titan intercontinental missile, standing in a crisscross of girders 700 feet away. Even under thirteen feet of asbestos-lined roof this was the nearest the launchers dare be to the 110-ton monster when it flames into action.'

'On the Californian coast and in Colorado, gigantic holes to house the monster missiles are being excavated. They are the first of hundreds of such pits . . .'

Thus Mr. Chapman Pincher, science editor of the *Daily Express* reporting from Cape Canaveral in 1959.



Ninety-four years before, in 1865, Jules Verne, the French author whose visions of the future make the science-fiction writer of our own time seem very leaden-footed earthmen by

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comparison, published his book *From the Earth to the Moon*. It is a story of a manned projectile fired at the Moon from an enormous gun.

This was how he described the building of a launching pad in a "wild part of Florida", only a few miles from Cape Canaveral, and the creation of the Columbiad cannon which was to hurl the first men into outer space.

'We had to dig a pit sixty feet in diameter down to a depth of 900 feet. This great work had to be completed within eight months. There were 2,543,400 cubic feet of earth to excavate—in round numbers 2,000 cubic feet per day.

'During the eight months which were employed in the work of excavation, the preparatory works of the casting of the gun had been carried on simultaneously with extreme rapidity. At 600 yards from the well, rose 1,200 reverberating ovens, each six feet in diameter . . . It will be readily understood that 1,200 furnaces were not too many to melt simultaneously 60,000 tons of iron . . . The casting of the gun was to take place on the 9th of July. The previous evening each furnace had been charged with 114,000 lbs of metal in bars. At daybreak 1,200 chimneys vomited their torrents of flame into the air, and the ground was agitated with dull tremblings . . . Twelve o'clock struck. Twelve hundred melting-troughs were opened and twelve hundred fiery serpents crept towards the central well . . . there, down they plunged with a terrific noise into a depth of 900 feet. It was an exciting and magnificent spectacle. The ground trembled, while these molten waves, launching into the sky their wreaths of smoke, evaporated the moisture of the mould and hurled it upwards through the vent-holes of the stone lining in the form of dense vapour clouds. These artificial clouds unrolled their thick spirals to a height of 1,000 yards into the air. A savage, wandering somewhere beyond the limits of the horizon, might have believed that some new crater was forming in the bosom of Florida, although there was

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neither eruption, nor typhoon, nor storm, nor struggle of the elements, nor any of those terrible phenomena which nature is capable of producing.

'No, it was man alone who had produced these reddish vapours, these gigantic flames worthy of a volcano, these tremendous vibrations resembling a shock of an earthquake . . . and it was his hand which precipitated into an abyss, dug by himself, a whole niagara of molten metal.'

'And then, after the gun had been cast, the projectile constructed, brought to the launching pit, manned by the three men who decided to make the journey to the Moon, and placed inside the giant tube of the cannon, the order "Fire!" was given:

'All eyes were fixed upon the yawning mouth of the Columbiad. It wanted scarce forty seconds to the moment of departure, but each second seemed to last an age. At the twentieth there was a general shudder, as it occurred to the minds of the vast crowd that the bold travellers shut up within the projectile were also counting . . .'

The first manned rocket to the Moon was on its way.

* * *

We have seen that science-fiction or prophetic story-telling on the conquest of space is at least two thousand years old. Nevertheless, Jules Verne has often been called "the first science-fiction writer" and, indeed, he was the first writer whose art stemmed directly from a precise and knowledgeable scientific attitude. All his stories extend the known facts of his time to the possibilities of the future.

He was born in 1828, in Nantes, the son of a lawyer who was also a poet and a classicist. Although his father encouraged the

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literary ambitions of his son, he was anxious that Jules should also possess professional qualifications. After moving freely in the literary world of Paris, writing essays and novelettes of modest merit, Jules, at the age of twenty-eight, settled down to a more rewarding career. He became a stockbroker on the Paris Bourse. At this time he also became engaged to a pretty young widow, Honorine Anne Hebé-Morel, whom he married in 1856.

Though busy and prosperous in his business activities, Verne remained intensely interested in science, technology and exploration. During his spare time he wrote a short book on the prospects of balloon acronautics, but when several publishers rejected it, he threw the manuscript on the fire. Most fortunately, his wife saved it from destruction and, without telling her husband, showed the work to a Paris publisher, Hetzel.

This far-sighted man, who was to make a vast fortune publishing Verne's seventy full-length books and scores of his short stories, asked the young author to rewrite the work on ballooning as a fictional story.

Thus, in 1863, when Verne was thirty-five, his first science-fiction novel *Five Weeks in a Balloon*, was published. It was an immediate success and became a best-seller.

Two years later Hetzel published *From the Earth to the Moon* and, in 1870, a sequel, *Round the Moon*. However, it was three years before this second Moon story appeared that Verne achieved world fame with *Round the World in Eighty Days*. From then on his books were translated into many languages and sold by the million. They still do.

Shortly before he died in 1905, at the age of seventy-seven, Verne visited London. In an interview he said:

"My books in which I have published prophecies based upon latter-day discoveries of science have really been only a means to an end. It will perhaps surprise you to hear that I do not take special pride in having written of the motor car, the submarine

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and the navigable airship long before they became actual realities. When I wrote about them as realities, these things were already half-discoveries. I simply made fiction out of what became ultimate fact."

This statement is strikingly topical today. The journey of Verne's three heroes to the Moon has in our time nearly been achieved. Both the United States and the U.S.S.R. have announced as official governmental policy their intention of launching manned projectiles to the Moon.

Today any writer on the subject, has to contend with the risk that tomorrow's newspaper headlines may suddenly make all his tenses out of date.

Verne's account of a missile launched from Florida ninety-four years ago reads uncannily like a newspaper report of 1960.

Here is part of the introduction to *Round the Moon*, in which he briefly recapitulates what he had described in the first book *From the Earth to the Moon*.

★ ★ ★

'During the year 186-, the whole world was greatly excited by a scientific experiment unprecedented in the annals of science. The members of the Gun Club, a circle of artillerymen formed at Baltimore after the American civil war, concceived the idea of putting themselves in communication with the Moon, by sending to her a projectile.

'Their president, Barbicane, the promoter of the enterprise, having consulted the astronomers of the Cambridge Observatory, took all necessary means to ensure the success of the venture. After setting on foot a public subscription, which realized nearly £1,200,000, Barbicane, Major Elphinstone, and Joseph T. Maston, the principal members of the Gun Club, aided by others, began the gigantic work.

'According to the advice from the scientists of the Cambridge Observatory, the gun destined to launch the projectile had to be fixed in a country situated between the 0 and 28th degrees of

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north or south latitude\$ in order to aim at the Moon when at the zenith. The initial velocity of the projectile was fixed at 12,000 yards to the second.

'Launched on the 1st December at 10 hours 46 minutes 40 seconds p.m., the projectile ought to reach the Moon four days later, that is on the 5th December, at midnight precisely, at the moment of the Moon attaining her perigee, that is her nearest distance from the earth, which is exactly 86,410 French leagues, or 238,833 English miles.'

'A number of meetings between the Gun Club members and scientists were held at which the shape and composition of the Moon rocket were discussed, also the position and nature of the giant gun, and the quality and quantity of the explosive to be used.'

'Finally, it was decided that the projectile should be a shell made of aluminium with a diameter of 108 inches, a thickness of twelve inches to its walls; and should weigh 19,250 lbs. The gun should be a Columbiad cast in iron, 900 feet long, and run perpendicularly into a deep earth cavity. The explosive charge should contain 400,000 pounds of gun-cotton, which giving out six billions of litres of gas in the rear of the projectile, would easily carry it towards the Moon.'

'The launching site was chosen in Florida, in $27^{\circ} 7'$ North latitude, and $77^{\circ} 3'$ West (Greenwich) longitude.'

'It was on this spot, after stupendous labour of excavation that the Columbiad was cast with full success. Things stood thus when an incident took place which increased the interest in this great enterprise a hundredfold.'

'A Frenchman, Michel Ardan, asked to be enclosed in the Moon rocket, in order that he might reach the Moon and explore this terrestrial satellite. He landed in America, was received with enthusiasm, reconciled President Barbicane to his mortal enemy and critic, Captain Nicholl, and persuaded them both to embark with him on the Moon voyage.'

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'The proposition being accepted, the shape of the projectile was altered to take the three passengers. It was made of a cylindro-conical form, the aerial car was lined with strong springs and partitions to deaden the shock of the departure. It was stocked with food for a year, water for some months, and gas for some days. An apparatus supplied the three Moon travellers with air to breathe.

'On one of the highest points of the Rocky Mountains a gigantic telescope was erected, in order to follow the course of the Moon rocket through space.

'On the 30th November, at the hour fixed, from the midst of an enormous crowd of spectators, the departure took place.

'For the first time three human beings left the terrestrial globe and launched into interplanetary space with almost a certainty of reaching their destination. These bold Moon travellers ought to make the passage in 97 hours, 13 minutes and 20 seconds.

'Consequently, their arrival on the lunar globe could not take place until the 5th December at 12 at night, at the exact moment when the Moon should be full.

'But an unforeseen circumstance, the detonation produced by the Columbiad gun, had the effect of troubling the terrestrial atmosphere, by accumulating a large quantity of vapour. The Moon was thus hidden from the eyes of the watchers for several nights.

'Maston, the staunchest friend of the three travellers, started for the Rocky Mountains, accompanied by the Hon. J. Belfast, director of the Cambridge Observatory, and reached the station of Long's Peak, where the telescope was erected which brought the Moon within an apparent distance of two leagues. But the accumulations of clouds in the atmosphere prevented all observations on the 5th, 6th, 7th, 8th, 9th and 10th of December. Indeed it was thought that all observations would have to be put

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off until the 3rd of January for the Moon, entering its last quarter on the 11th of December, would then only present an ever-decreasing portion of her disk, insufficient to allow of their following the course of the projectile.

'A heavy storm, however, cleared the atmosphere on the night of the 11th and 12th of December, and the Moon, with half illuminated disk, was plainly to be seen upon the black sky.'

'That very night the station at Long's Peak detected the rocket and, with the help of the Cambridge Observatory, established that it had deviated from its course from some unknown cause, and had not reached its destination. The rocket had passed near enough to the Moon to be retained by the lunar attraction; its rectilinear movement had been changed to a circular one and, following an elliptical course round the Moon had gone into orbit and had become a satellite.'

'Calculations showed that the distance separating the rocket from the lunar surface might be about 2,833 miles.'

'The observers provided this double hypothesis: either the attraction of the Moon would draw the rocket to herself, and the three travellers would thus attain their aim; or that the rocket, held in an immutable orbit, would gravitate around the Moon for all eternity.'

'With such an alternative, what would be the fate of the travellers? They had food for some time. But suppose they did succeed in their rash enterprise and land on the Moon—how would they return? Could they ever return?'

'However, the observers had made several errors and had arrived at a wrong conclusion.'

In the sequel to *From the Earth to the Moon*, Jules Verne described what happened inside the Moon rocket and how the three intrepid travellers fared. Here are some passages from this second volume of the great vision of a Moon journey, which in so many details

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seems almost a description of the enterprise now being prepared at Cape Canaveral.

'At half-past two in the morning, the projectile was over the thirteenth lunar parallel and at the effective distance of 500 miles, reduced by the glasses to five. It still seemed impossible, however, that it could ever touch any part of the disk. Its motive speed, comparatively so moderate, was inexplicable to President Barbicane. At that distance from the Moon it must have been considerable, to enable it to bear up against her attraction. Here was a phenomenon the cause of which escaped them again. Besides, time failed them to investigate the cause. All lunar relief was defiling under the eyes of the travellers, and they would not lose a single detail.

'Under the glasses the disk appeared at the distance of five miles. What would an acronaut, borne to this distance from the earth, distinguish on its surface? We cannot say, since the greatest ascension has not been more than 25,000 feet.

'This, however, is an exact description of what Barbicane and his companions saw at this height. Large patches of different colours appeared on the disk. Selenographers are not agreed upon the nature of these colours. There are several, and rather vividly marked. Julius Schmidt, pretends that, if the terrestrial oceans were dried up, a Selenite observer could not distinguish on the globe a greater diversity of shades between the oceans and the continental plains than those on the Moon present to a terrestrial observer. According to him, the colour common to the vast plains known by the name of "seas" is a dark grey mixed with green and brown. Some of the large craters present the same appearance. Barbicane knew this opinion of the German selenographer, an opinion shared by Baer and Moedler. Observation has proved that right was on their side, and not on that of some astronomers who admit the existence of only grey on the Moon's surface. In some parts green was very distinct, such as springs,

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according to Julius Schmidt, from the seas of Serenity and Humours. Barbicane also noticed large craters, without any interior cones, which shed a bluish tint similar to the reflection of a sheet of steel freshly polished. These colours belonged really to the lunar disk, and did not result, as some astronomers say, either from the imperfection in the objective of the glasses or from the interposition of the terrestrial atmosphere.

'Michel Ardan was watching near the president, when he noticed long white lines, vividly lighted up by the direct rays of the sun. It was a succession of luminous furrows, very different from the radiation of Copernicus not long before; they ran parallel with each other.

'Michel, with his usual readiness, hastened to exclaim:

"Look there! cultivated fields!"

"Cultivated fields!" replied Nicholl, shrugging his shoulders.

"Ploughed, at all events," retorted Michel Ardan; "but what labourers those Selenites must be, and what giant oxen must harness to their plough to cut such furrows!"

"They are not furrows," said Barbicane; "they are rifts."

"Rifts? Stuff!" replied Michel mildly; "but what do you mean by 'rifts' in the scientific world?"

Barbicane immediately enlightened his companion as to what he knew about lunar rifts. He knew that they were a kind of furrow found on every part of the disk which was not mountainous; that these furrows, generally isolated, measured from 400 to 500 leagues in length; that their breadth varied from 1,000 to 1,500 yards, and that their borders were strictly parallel; but he knew nothing more either of their formation or their nature.

Barbicane, through his glasses, observed these rifts with great attention. He noticed that their borders were formed of steep declivities; they were long parallel ramparts, and with some small

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amount of imagination he might have admitted the existence of long lines of fortifications, raised by Selenite engineers. Of these different rifts some were perfectly straight, as if cut by a line; others were slightly curved, though still keeping their borders parallel; some crossed each other, some cut through craters; here they wound through ordinary cavities, such as Posidonius or Petavius; there they wound through the seas, such as the Sea of Serenity.

'But the projectile had now attained 40° of lunar lat., at a distance not exceeding 400 miles. Through the glasses objects appeared to be only four miles distant.

'At this point, under their feet, rose Mount Helicon, 1,520 feet high, and round about the left rose moderate elevations, enclosing a small portion of the Sea of Rains, under the name of the Gulf of Iris. The terrestrial atmosphere would have to be one hundred and seventy times more transparent than it is, to allow astronomers to make perfect observations on the Moon's surface; but in the void in which the projectile floated no fluid interposed itself between the eye of the observer and the object observed. And more, Barbicane found himself carried to a greater distance than the most powerful telescopes had ever done before, either that of Lord Rosse or that of the Rocky Mountains. He was, therefore, under extremely favourable conditions for solving that great question of the habitability of the Moon; but the solution still escaped him; he could distinguish nothing but desert beds, immense plains, and towards the north, arid mountains. Not a work betrayed the hand of man; not a ruin marked his course; not a group of animals was to be seen indicating life, even in an inferior degree. In no part was there life, in no part was there an appearance of vegetation. Of the three kingdoms which share the terrestrial globe between them, one alone was represented on the lunar, and that was the mineral.

'Towards four in the morning, at the height of the fiftieth parallel, the distance was reduced to 300 miles. To the left ran

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a line of mountains capriciously shaped, lying in the full light. To the right, on the contrary, lay a black hollow resembling a vast well, unfathomable and gloomy, drilled into the lunar soil.

'This hole was the "Black Lake"; it was Pluto, a deep circle which can be conveniently studied from the earth, between the last quarter and the new moon, when the shadows fall from west to east. This black colour is rarely met with on the surface of the satellite. As yet it has only been recognized in the depths of the circle of Endymion, to the east of the Cold Sea, in the northern hemisphere, and at the bottom of Grimaldi's circle, on the equator, towards the eastern border of the orb.

'Towards five in the morning the northern limits of the Sea of Rains was at length passed. The mounts of Condamine and Fontenelle remained—one on the right, the other on the left. That part of the disk beginning with 60° was becoming quite mountainous. The glasses brought them to within two miles, less than that separating the summit of Mont Blanc from the level of the sea. The whole region was bristling with spikes and circles. Towards the 60° Philolaus stood predominant at a height of 5,550 feet with its elliptical crater, and seen from this distance, the disk showed a very fantastical appearance. Landscapes were presented to the eye under very different conditions from those on the earth, and also very inferior to them.

'The Moon having no atmosphere, the consequences arising from the absence of this gaseous envelope have already been shown. No twilight on her surface; night following day and day following night with the suddenness of a lamp which is extinguished or lighted amidst profound darkness—no transition from cold to heat, the temperature falling in an instant from boiling-point to the cold of space.

'Meteors might create serious perils for the travellers. They were to them so many sandbanks upon that sea of ether which, less fortunate than sailors, they could not escape. But did these

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adventurers complain of space? No, no; since nature had given them the splendid sight of a cosmical meteor bursting from expansion, since this inimitable firework, which no Ruggieri could imitate, had lit up for some seconds the invisible glory of the Moon. In that flash, continents, seas, and forests had become visible to them. Did an atmosphere, then, bring to this unknown face its life-giving atoms? Questions still insoluble, and for ever closed against human curiosity!

'It was then half past three in the afternoon. The projectile was following its curvilinear direction round the Moon. Had its course again been altered by the meteor? It was to be feared so. But the projectile must describe a curve unalterably determined by the laws of mechanical reasoning. Barbicane was inclined to believe that this curve would be rather a parabola than a hyperbola. But admitting the parabola, the projectile must quickly have passed through the cone of shadow projected into space opposite the sun. This cone, indeed, is very narrow, the angular diameter of the Moon being so little when compared with the diameter of the orb of day; and up to this time the projectile had been floating in this deep shadow. Whatever had been its speed (and it could not have been insignificant) its period of occultation continued.

'Another consequence of this want of air is that absolute darkness reigns where the sun's rays do not penetrate. That which on earth is called diffusion of light, that luminous matter which the air holds in suspension, which creates the twilight and the day-break, which produces the umbrae and the penumbrae, and all the magic of chiaroscuro, does not exist on the Moon. Hence the harshness of contrasts, which only admit the two colours, black and white. If a Scienite were to shade his eyes from the sun's rays, the sky would seem absolutely black, and the stars would shine to him as on the darkest night.

'A lunar landscape without the softening of the phenomena of chiaroscuro could not be rendered by an earthly landscape

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painter; it would be spots of ink on a white page—nothing more.

'This aspect was not altered even when the projectile, at the height of 80°, was only separated from the Moon by a distance of fifty miles; nor even when, at five in the morning, it passed at less than twenty-five miles from the mountain of Gioja, a distance reduced by the glasses to a quarter of a mile. It seemed as if the Moon might be touched by the hand! It seemed impossible that, before long, the projectile would not strike her, if only at the north pole, the brilliant arch of which was so distinctly visible on the black sky.'

'At that moment, at six o'clock, the lunar pole appeared. The disk only presented to the travellers' gaze one half brilliantly lit up, whilst the other disappeared in the darkness. Suddenly the projectile passed the line of demarcation between intense light and absolute darkness, and was plunged in profound night.'



'The sight of this desolate world did not fail to captivate them by its very strangeness. They were moving over this region as if they had been borne on the breath of some storm, watching heights defile under their feet, piercing the cavities with their eyes, going down into the rifts, climbing the ramparts, sounding these mysterious holes, and levelling all cracks. But no trace of vegetation, no appearance of cities; nothing but stratification, beds of lava, overflowings polished like immovable mirrors, reflecting the sun's rays with overpowering brilliancy. Nothing belonged to a living world—everything to a dead world, where avalanches, rolling from the summits of the mountains, would disperse noiselessly at the bottom of the abyss, retaining the motion, but wanting the sound. In any case it was the image of death, without its being possible even to say that life ever existed there.'

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'Michel Ardan, however, thought he recognized a heap of ruins, to which he drew Barbicane's attention.' It was about the 80th parallel, in 30° longitude. This heap of stones, rather regularly placed, represented a vast fortress, overlooking a long rift, which in former days had served as a bed to the rivers of prehistorical times. Not far from that, rose to a height of 17,400 feet the annular mountain of Short, equal to the Asiatic Caucasus. Michel Ardan, with his accustomed ardour, maintained, "the evidences" of his fortress. Beneath it he discerned the dismantled ramparts of a town; here the still intact arch of a portico, there two or three columns lying under their base; farther on, a succession of arches which must have supported the conduit of an aqueduct; in another part the sunken pillars of a gigantic bridge, run into the thickest parts of the rift.

"Ah! my friends," exclaimed Michel, "can you picture to yourselves what this now peaceful orb of night must have been when its craters, filled with thunderings, vomited at the same time smoke and tongues of flame. What a wonderful spectacle then, and now what decay? This Moon is nothing more than a thin carcass of fireworks, whose squibs, rockets, serpents, and suns, after a superb brilliancy, have left but sadly broken cases. Who can say the cause, the reason, the motive force of these cataclysms?"

'Barbicane was not listening to Michel Ardan; he was contemplating those ramparts of Clavius, formed by large mountains spread over several miles. At the bottom of the immense cavity burrowed hundreds of small extinguished craters, riddling the soil like a colander, and overlooked by a peak 15,000 feet high.

'Around, the plain appeared desolate. Nothing so arid as these reliefs, nothing so sad as these ruins of mountains, and (if we may so express ourselves) these fragments of peaks and mountains which strewed the soil. The satellite seemed to have burst at this spot.

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'The projectile was still advancing, and this movement did not subside. Circles, craters, and uprooted mountains succeeded each other incessantly. No more plains, no more seas. A never ending Switzerland and Norway. And lastly, in the centre of this region of crevasses, the most splendid mountain on the lunar disk, the dazzling Tycho, in which posterity will ever preserve the name of the illustrious Danish astronomer. Tycho is situated in 43° south lat., and 12° east long. Its centre is occupied by a crater fifty miles broad. It assumes a slightly elliptical form, and is surrounded by an enclosure of annular ramparts, which on the east and west overlook the outer plain from a height of 15,000 feet. It is a group of Mont Blancs, placed round one common centre, and crowned by radiating beams.

'What this incomparable mountain really is, with all the projections converging towards it, and the interior excrescences of its crater, photography itself could never represent.

'The distance which separated the travellers from the annular summits of Tycho was not so great but that they could catch the principal details. Even on the causeway forming the fortifications of Tycho, the mountains hanging on to the interior and exterior sloping flanks rose in stories like gigantic terraces. They appeared to be higher by 300 or 400 feet to the west than to the east. No system of terrestrial encampment could equal these natural fortifications. A town built at the bottom of this circular cavity would have been utterly inaccessible.

'Inaccessible and wonderfully extended over this soil covered with picturesque projections! Indeed, nature had not left the bottom of this crater flat and empty. It possessed its own peculiar orography, a mountainous system, making it a world in itself. The travellers could clearly distinguish cones, central hills, remarkable positions of the soil, naturally placed to receive the chef-d'œuvre of Selenite architecture. There was marked out the place for a temple, here the ground of a forum, on this spot the plan of a palace, in another the plateau for a citadel; the whole

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overlooked by a central mountain of 1,500 feet. A vast circle, in which ancient Rome could have been held in its entirety ten times over.

'They had passed suddenly from excessive cold to intense heat. Nature was thus preparing them to become Selenites. Become Selenites ! That idea brought up once more the question of the habitability of the moon. After what they had seen, could the travellers solve it ? Would they decide for or against it ? Michel Ardan persuaded his two friends to form an opinion, and asked them directly if they thought that men and animals were represented in the lunar world.

"Without a doubt !" answered Nicholl.

"I would answer that we have observed the lunar continent at a distance of 500 yards at most, and that nothing seemed to us to move on the Moon's surface," said Barbicane.

"The presence of any kind of life would have been betrayed by its attendant marks, such as divers buildings, and even by ruins. And what have we seen ? Everywhere and always the geological works of nature, never the work of man. If, then, there exist representatives of the animal kingdom on the Moon, they must have fled to those unfathomable cavities which the eye cannot reach; which I cannot admit, for they must have left traces of their passage on those plains which the atmosphere must cover, however slightly raised it may be. These traces are nowhere visible. There remains but one hypothesis, that of a living race to which motion, which is life, is foreign."

"One might as well say, living creatures which do not live," replied Michel.

"Very well," continued Michel Ardan, "the Scientific Commission assembled in the projectile of the Gun Club, after having founded their argument on facts recently observed, decide unanimously upon the question of the habitability of the Moon—'No ! the Moon is not habitable.'"

"Now," said Nicholl, "let us attack the second question, an

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indispensable 'complement of the first. I ask the honourable Commission, if the Moon is not habitable, has she ever been inhabited, Citizen Barbicane?'

"My friends," replied Barbicane, "I did not undertake this journey in order to form an opinion on the past habitability of our satellite; but I will add that our personal observations only confirm me in this opinion. I believe, indeed I affirm, that the Moon has been inhabited by a human race organized like our own, that she has produced animals anatomically formed like the terrestrial animals; but I add that these races, human or animal, have had their day, and are now for ever extinct!"

"Then," asked Michel, "the Moon must be older than the earth?"

"No!" said Barbicane decidedly, "but a world which has grown old quicker, and whose formation and deformation have been more rapid. Relatively, the organizing force of matter has been much more violent in the interior of the Moon than in the interior of the terrestrial globe. The actual state of this cracked, twisted, and burst disk abundantly proves this. The Moon and the earth were nothing but gaseous masses originally. These gasses have passed into liquid state under different influences, and the solid masses have been formed later. But most certainly our sphere was still gaseous or liquid, when the Moon was solidified by cooling, and had become habitable."

"Those speculations are too high," said Barbicane; "problems utterly insoluble. Do not let us enter upon them. Let us only admit the insufficiency of the primordial attraction; and then by the inequality of the two motions of rotation and revolution, the days and nights could have succeeded each other on the Moon as they succeed each other on the earth. Besides, even without these conditions, life was possible."

"And so," asked Michel Ardan, "humanity has disappeared from the Moon?"

"Yes," replied Barbicane, "after having doubtless remained

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persistently for millions of centuries, by degrees the atmosphere becoming rarefied, the disk became uninhabitable, as the terrestrial globe will one day become by cooling."

"By cooling?"

"Certainly," replied Barbicane; "as the internal fires became extinguished, and the incandescent matter concentrated itself, the lunar crust cooled. By degrees the consequences of these phenomena showed themselves in the disappearance of organized beings and by the disappearance of vegetation. Soon the atmosphere was rarefied, probably withdrawn by terrestrial attraction; then aerial departure of respirable air, and disappearance of water by means of evaporation. At this period the Moon becoming uninhabitable, was no longer inhabited. It was a dead world, such as we see it today."

"And you say that the same fate is in store for the earth?"

"Most probably."

"But when?"

"When the cooling of its crust shall have made it uninhabitable."

"And have they calculated the time which our unfortunate sphere will take to cool?"

"Certainly, my good Michel," replied Barbicane quietly, "we know what diminution of temperature the earth undergoes in the lapse of a century. And according to certain calculations, this mean temperature will, after a period of 400,000 years, be brought down to zero!"

"Four hundred thousand years!" exclaimed Michel. "Ah, I breathe again. Really I was frightened to hear you; I imagined that we had not more than 50,000 years to live."

Barbicane and Nicholl could not help laughing at their companion's uneasiness. Then Nicholl, who wished to end the discussion, put the second question, which had just been considered again.

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"Has the Moon been inhabited?" he asked.

'The answer was unanimously in the affirmative. But during this discussion, fruitful in somewhat hazardous theories, the projectile was rapidly leaving the Moon; the lineaments faded away from the travellers' eyes, mountains were confused in the distance; and of all the wonderful, strange and fantastical form of the earth's satellite, there soon remained nothing but the imperishable remembrance.'

CHAPTER THIRTEEN

The First Men in the Moon

FOR two thousand years there was a continuous stream of travellers to the Moon. From their supernatural or visionary visits to the planet they brought back reports of its landscape, its riches, and its inhabitants. That their journeys were made only in their imagination, matters little. Like all great discoveries and explorations the conquest of the Moon started as a dream and is becoming a reality.

The first men to land on the Moon are waiting for the signal "go". They will carry with them all the necessary instruments for "probing" the Moon, as if it were a diseased specimen of matter. They are confident to return to earth with the records of their expedition. Scientists will then collect their data, interrogate the travellers, examine, analyse, compute, study, and discuss the results. They may, perhaps, even tell us what they have discovered.

It will all be very different from Jules Verne's pseudo-factual description of the Moon, which his imaginary explorers, a century ago, had circumnavigated at a distance of only 1,500 feet. And very different, too, from the pseudo-scientific report that H. G. Wells made his intrepid ambassadors bring back in his book *The First Men in the Moon*, some sixty years ago. Well's book is still widely read and does not require detailed quotation. His heroes were two very dissimilar explorers: Mr. Bedford, a man who was out for money, who saw the Moon as a gigantic

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business proposition, a mine of mineral wealth, a field for planetary concessions and industrial monopolies; Mr. Cavor, on the other hand, was a "boffin", a dreamer who believed that scientific progress and discovery of the mysteries of the universe were rewarding in themselves.

Though armed with the knowledge of modern technology, Wells borrowed freely from the more romantic writers of imaginary Moon travels. The sphere in which Bedford and Cavor ascended to the planet was enclosed with moving roller-blinds made of "Cavorite", a substance immune to the laws of gravity. With the blinds closed air-tight, the sphere could fly in space at the will of its navigators. Opening the blinds, partly or fully, resulted in the sphere becoming subject to natural gravity and attraction. Thus the space vehicle could fly through space, be directed towards the Moon and brought down to earth without problem. Memories of Defoc's "Lunar Earth", of Atterley's "Lunarium", of Cyrano's dew bottles and even Elijah's "calcinated loadstone" are conjured up.

There are passages in Wells's book that surpass Hollywood's scripts of horror films. Such as the first encounters of his explorers with the lunar inhabitants, the mountain-like, two-hundred-fcet-long, stupid and gregarious moon calves and their masters, the horrible, insect-like Selenites.

★ ★ *

"So we two poor terrestrial castaways, lost in that wild-growing moon jungle, crawled in terror before the sounds that had come upon us. We crawled, as it seemed, a long time before we saw either Selenite or mooncalf, though we heard the bellowing and gruntulous noises of these latter continually drawing nearer to us. We crawled through stony ravines, over snow slopes, amidst fungi that rippled like thin bladders at our thrust, emitting a watery humour, over a perfect pavement of things like puff-balls, and beneath interminable thickets of scrub. And ever more helplessly our eyes sought for our abandoned sphere. The noise

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of the mooncalves would at times be a vast flat calf-like sound, at times it rose to an amazed and wrathy bellowing, and again it would become a clogged bestial sound, as though these unseen creatures had sought to eat and bellow at the same time.

'Our first view was but an inadequate transitory glimpse, yet none the less disturbing because it was incomplete. Cavor was crawling in front at the time, and he first was aware of their proximity. He stopped dead, arresting me with a single gesture.

'A crackling and smashing of the scrub appeared to be advancing directly upon us, and then, as we squatted close and endeavoured to judge of the nearness and direction of this noise, there came a terrific bellow behind us, so close and vehement that the tops of the bayonet scrub bent before it, and one felt the breath of it hot and moist. And, turning about, we saw indistinctly through a crowd of swaying stems the mooncalf's shining sides, and the long line of its back loomed out against the sky.

'Of course it is hard for me now to say how much I saw at that time, because my impressions were corrected by subsequent observation. First of all impressions was its enormous size; the girth of its body was some fourscore feet, its length perhaps two hundred. Its sides rose and fell with its laboured breathing. I perceived that its gigantic, flabby body lay along the ground, and that its skin was of a corrugated white, dappling into blackness along the backbone. But of its feet we saw nothing. I think also that we saw then the profile at least of the almost brainless head, with its fat-encumbered neck, its slobbering omnivorous mouth, its little nostrils, and tight shut eyes. (For the mooncalf invariably shuts its eyes in the presence of the sun.)

'We had a glimpse of a vast red pit as it opened its mouth to bleat and bellow again; we had a breath from the pit, and then the monster heeled over like a ship, dragged forward along the ground, creasing all its leathery skin, rolled again, and so swallowed past us, smashing a path amidst the scrub, and was speedily hidden from our eyes by the dense interlacings beyond. Another

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appeared more distantly, and then another, and then, as though he was guiding these animated lumps of provender to their pasture, a Selenite came momentarily into ken. My grip upon Cavor's foot became convulsive at the sight of him, and we remained motionless and peering long after he had passed out of our range.

'By contrast with the mooncalves he seemed a trivial being, a mere ant, scarcely five feet high. He was wearing garments of some leathery substance, so that no portion of his actual body appeared, but of this, of course, we were entirely ignorant. He presented himself, therefore, as a compact, bristling creature, having much of the quality of a complicated insect, with whip-like tentacles and a clanging arm projecting from his shining cylindrical body case. The form of his head was hidden by his enormous many-spiked helmet—we discovered afterwards that he used the spikes for prodding refractory mooncalves—and a pair of goggles of darkened glass, set very much at the side, gave a bird-like quality to the metallic apparatus that covered his face. His arms did not project beyond his body case, and he carried himself upon short legs that, wrapped though they were in warm coverings, seemed to our terrestrial eyes inordinately flimsy. They had very short thighs, very long shanks, and little feet.

'In spite of his heavy-looking clothing, he was progressing with what would be, from the terrestrial point of view, very considerable strides, and his clanging arm was busy. The quality of his motion during the instant of his passing suggested haste and a certain anger, and soon after we had lost sight of him we heard the bellow of a mooncalf change abruptly into a short, sharp squeal followed by the scuffle of its acceleration. And gradually that bellowing receded, and then came to an end, as if the pastures sought had been attained.

'We listened. For a space the moon world was still. But it was some time before we resumed our crawling search for the vanished sphere.

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'Suddenly the crack that had been admitting the light broadened out, and revealed itself as the space of an opening door. Beyond was a sapphire vista, and in the doorway stood a grotesque outline silhouetted against the glare.

'We both made convulsive efforts to turn, and failing, sat staring over our shoulders at this. My first impression was of some clumsy quadruped with lowered head. Then I perceived it was the slender pinched body and short and extremely attenuated bandy legs of a Selenite, with his head depressed between his shoulders. He was without the helmet and body covering they wear upon the exterior.

'He was a blank, black figure to us, but instinctively our imaginations supplied features to his very human outline.

'He came forward three steps and paused for a time. His movements seemed absolutely noiseless. Then he came forward again. He walked like a bird, his feet fell one in front of the other. He stepped out of the ray of light that came through the doorway, and it seemed as though he vanished altogether in the shadow.

'For a moment my eyes sought him in the wrong place, and then I perceived him standing facing us both in the full light. Only the human features I had attributed to him were not there at all !

'Of course I ought to have expected that, only I didn't. It came to me as an absolute, for a moment an overwhelming shock. It seemed as though it wasn't a face, as though it must needs be a mask, a horror, a deformity, that would presently be disavowed or explained. There was no nose, and the thing had dull bulging eyes at the side—in the silhouette I had supposed they were ears. There were no ears.... I have tried to draw one of these heads, but I cannot. There was a mouth, downwardly curved, like a human mouth in a face that stares ferociously. . . .

'The neck on which the head was poised was jointed in three places, almost like the short joints in the leg of a crab. The joints of the limbs I could not see, because of the puttce-like

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straps in which they were swathed, and which formed the only clothing the being wore.

'There the thing was, looking at us !

'It was down this shaft they took him, in this "sort of balloon" he speaks of, at first into an inky blackness and then into a region of continually increasing phosphorescence. Cavor's dispatches show him to be curiously regardless of detail for a scientific man, but we gather that this light was due to the streams and cascades of water—"no doubt containing some phosphorescent organism"—that flowed ever more abundantly downward towards the Central Sea. And as he descended, he says, "The Selenites also became luminous." And at last far below him he saw, as it were, a lake of heatless fire, the waters of the Central Sea, glowing and eddying in strange perturbation, "like luminous blue milk that is just on the boil."

"This Lunar Sea," says Cavor, in a later passage "is not a stagnant ocean; a solar tide sends it in a perpetual flow around the lunar axis, and strange storms and boilings and rushings of its waters occur, and at times cold winds and thunderings that ascend out of it into the busy ways of the great ant-hill above. It is only when the water is in motion that it gives out light; in its rare seasons of calm it is black. Commonly, when one sees it, its waters rise and fall in an oily swell, and flakes and big rafts of shining, bubbly foam drift with the sluggish, faintly glowing current. The Selenites navigate its cavernous straits and lagoons in little shallow boats of a canoe-like shape; and even before my journey to the galleries about the Grand Lunar, who is Master of the Moon, I was permitted to make a brief excursion on its waters.

"The caverns and passages are naturally very tortuous. A large proportion of these ways are known only to expert pilots among the fisherinen, and not infrequently Selenites are lost for

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ever in their labyrinths. In their remoter recesses, I am told, strange creatures lurk, some of them terrible and dangerous creatures that all the science of the Moon has been unable to exterminate. There is particularly the Rapha, an inextricable mass of clutching tentacles that one hacks to pieces only to multiply; and the Tzee, a darting creature that is never seen, so subtly and suddenly does it slay . . .”

“In one great place heavy with glistening stalactites a number of boats were fishing. We went alongside one of these and watched the long-armed Selenites winding in a net. They were little, hunchbacked insects, with very strong arms, short, bandy legs, and crinkled face-masks. As they pulled at it that net seemed the heaviest thing I had come upon in the Moon; it was loaded with weights—no doubt of gold—and it took a long time to draw, for in those waters the larger and more edible fish lurk deep. The fish in the net came up like a blue moonrise—a blaze of darting, tossing blue.

‘Among their catch was a many-tentaculate, evil-eyed black thing, ferociously active, whose appearance they greeted with shrieks and twitters, and which with quick nervous movements they hacked to pieces by means of little hatchets. All its dis-severed limbs continued to lash and writhe in a vicious manner. Afterwards, when fever had hold of me, I dreamt again and again of that bitter, furious creature rising so vigorous and active out of the unknown sea. It was the most active and malignant thing of all the living creatures I have yet seen in this world inside the Moon. . . .’

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Wells’s Selenites were the ultimate products of evolution. They were not just “super-men”. They had advanced beyond the borders of humanity. They were highly specialized, over-organized, ultra-efficient monster robots, mechanical brain-computers within pulsating living bodies—the terrifying examples of beings who might evolve from man.

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Science-fiction and film script writers eagerly seized upon the subject. Their "men from outer space", their "invaders from other worlds", are invariably horrible monsters. They are without any semblance to the friendly, beautiful, or sophisticated lunar inhabitants in the stories of imaginary Moon travellers of centuries gone by, those Selenites who lived on pleasant vapours, slept on beds of flowers and spent their leisure in philosophical meditations.

It would be idle to offer excerpts from the more recent books of this kind, dealing with expeditions into the universe, or telling of invaders from the planets against our own world. Though Edgar Rice Burroughs's books warrant a mention because of their romantic background, and, particularly, his *Moon Maid*, because in this romance mere man remains triumphant over the inhuman, terrible "Kalkars", who invade the earth from the Moon.

The Moon travellers of today are the tough, imperturbable, well-trained technicians in the uniforms of the Air Forces of the major powers. Already, aviation experts are calculating the fares for week-end trips to the Moon. In December of 1959, Dr. W. F. Hilton, head of the Astronautics Division of the Hawker-Siddeley Group, stated that within ten years, and after men had been put into orbit and accomplished re-entry and landing, "more elaborate missions will follow," culminating in regular flights to the Moon. He expressed his conviction that there will be "limited but definite civilian demand to visit the Moon", and he volunteered an estimate of the passenger fares Moon airlines will charge "£50,000 for a return ticket" offering comfortable accommodation with a view of the Sea of Serenity, high-class cuisine and all excursions to the craters and mountains included. And Dr. Hilton added that he was confident that "the British, with our tradition of exploration of the polar regions, jungles and mountain tops, may well emerge as the colonists of these new worlds, by virtue of our national character. . . ." Bishop Wilkins,

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looking down from Heaven, may with satisfaction recall that he used almost the same words some three hundred years ago.

Man's romantic *affaire* with the Queen of Heaven is at an end. The Moon has been drawn down from man's spiritual life to a level of utilitarian, even contemptuous familiarity. Children alive today will, perhaps, yearn after the mysteries of stars beyond our solar system, after other suns and planets in universes yet unknown. For the dream of the Moon is over. The joy of it may never be equalled again.

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